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REVIEWED

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NEW
NEXUS PHONES REVIEWED

6P **5X**

+ MARSHMALLOW TIPS

4K TVs
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ISSUE 247 FEB 2016

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JIM MARTIN

Laptop or tablet?

Two-in-ones aim to offer the best of both worlds

Welcome to another issue of PC Advisor. As we wait patiently for the arrival of the Surface Book on this side of the pond, we've been testing out the latest Surface Pro 4 along with Apple's two-in-one contender, the iPad Pro.

Apple doesn't call it that, of course, but it's hard not to compare it with Microsoft's 'hybrid' as they're both tablets that you can also use like a laptop when you buy their optional keyboards. Are they the best of both worlds? You can turn to page 24 to find out. Whether you agree with the verdict or not, it seems like every laptop manufacturer is churning out two-in-ones, including an updated Switch 11 from Acer (page 33).

Microsoft may not call itself a software company any more, but that hasn't stopped it releasing a new version of Office to go alongside the subscription service, Office 365. However, Office 2016 is a lot more than merely updated versions of Word, Excel and PowerPoint, as we find out on page 58.

And if you're after a new phone, Google has a couple of new options in the form of the Nexus 5X and 6P (page 34). No longer budget models with specifications that out-punch pricier phones, the newcomers are top-tier hardware with prices to match. That's not to say they're not good value, though: they are. They're the first to run the new version of Android 6, better-known as Marshmallow. It adds tweaks and refinements that make Android even better to use, and we've explained how to use the new features starting on page 102.

The latest security cameras make it easier than ever to keep an eye on your home, children, pets – or anything you like. We've tested out six systems on page 82, none of which will break the bank. They all provide alerts on your phone as well as live feeds and the option to record events when motion is detected. Some are better than others, of course, but our buyer's guide will help you spend your money wisely.

We've also rounded up a selection of the newest 4K TVs (page 72). It's a better time than ever to buy one, but you still have to watch out for models that won't necessarily be compatible in the future. 4K video looks fantastic, and 2016 is shaping up to be the year when we see much, more ultra-high-definition TV, movies and sports being broadcast and streamed.

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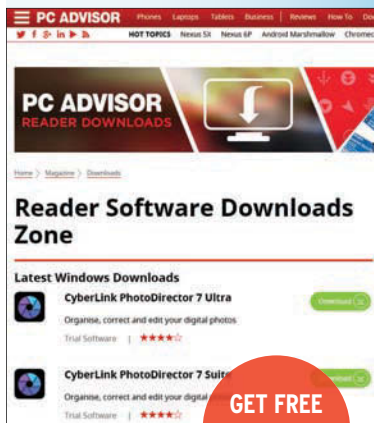
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TEST CENTRE

TOP 5 CHARTS: BUYER'S GUIDE

Microsoft releases first major Windows 10 update

Microsoft's first major update for Windows 10 has a number of welcome new features

We're big fans of Windows 10, but Microsoft hasn't rested on its laurels. Better messaging, improved device activation and media casting comprise several significant improvements within the first major patch to Windows 10 since its release in July. We've picked our favourite five improvements.

Cortana

To boost Cortana's usefulness, Microsoft has taught it three new tricks: it can track your movies and other ticketed events automatically, via your email; it can read 'handwritten' notes via a Surface stylus; and you can now 'Ask Cortana' for additional context within PDFs. Ticket tracking is a nice twist on the flight-tracking capabilities that Google Now, Cortana and Siri already offer, and the ability to understand scrawled notes will be handy for those who use a Surface tablet frequently in an undocked mode.

Microsoft's answer to the Chromecast

Microsoft originally dubbed this "media casting via Microsoft Edge," and mentioned how Windows 10 can now cast to any Miracast or DLNA device connected on the same network. In reality, you probably won't know what devices on your network are compliant until you try to click the '...' menu and select Cast Media to Device.

The idea is that Windows 10's Edge browser will allow you to stream YouTube videos, Facebook photos and Spotify songs from your Edge browser to your other devices. Unfortunately, our preview software just didn't seem to work. We were able to push a YouTube video from a Surface 3 to the Xbox One just once, where it stalled after a second or two. And Edge asked for a PIN code from the Roku 3, which that box failed to provide. But for the Xbox One and Roku 3, there are already native YouTube apps that do a better job. (There may be other DLNA Miracast devices that lack native apps.)

Snapped apps

One of the joys of Windows 10 is Snap. Simply by holding the Windows key and an arrow key, you can quickly order a highlighted window into half or even a quarter of the screen. But if you want to fiddle with the alignment, you're forced to manually resize one window, then the other until everything's just so. A new toggle in the Settings app does away with this.

If you so choose, two windows snapped adjacent to one another can be adjusted by 'grabbing' the border between the two and sliding the windows back and forth. Also, while in tablet mode, apps can now be snapped to the left and right. Apps can now be dismissed by swiping down – a feature that was originally part of Windows 8.

Activation headaches

Since the launch of Windows 10, the issue we've received the most questions about is whether upgrading from Windows 7 or 8 will erase your old files. What happens if you want to perform a clean install of Windows 10? A couple of improvements have helped.

Windows 10 hunts down your old license key within your PC and uses it to activate the installation. But if that doesn't work, you now have the option to enter the key either during or even after the installation (Settings > Update & security > Activation). If you do use a USB key to upgrade to Windows 10, Microsoft recommends that you remove the key as soon as the upgrade process begins, to avoid having to enter a product key. If you're too late, reboot.

Microsoft has also said that it'll upgrade its Media Creation Tool to provide a single Windows 10 image that will upgrade any 32- or 64-bit device, whether it be Home or Pro.

Messaging

One trick we like is Windows 10's newfound ability to send a SMS text directly from Cortana. Instead of tethering your phone via a cable or Bluetooth, the PC's Cortana looks for a Windows phone that you're logged into and automatically sends the text. It even pops up a notification on the phone alerting you that your text has been sent.

It's the first step in the eventual integration of messaging directly into Windows 10. The new build should allow you to download a Messaging app, where you can carry on Skype conversations without the need to drop into the Skype app itself. The idea is that, on a Windows 10 phone, SMS and Skype and other messaging apps will all live within the same app. You can see a bit of this, too, with Mail's unified inbox.

The runners-up

• The columns of Start tiles have expanded from three to four tiles across, while the number of tiles now supported by Windows 10 has increased to a whopping 2048.
• A new Xbox beta app now includes a handy feature to find your Facebook friends who have Xbox Live gamer tags.

CHRIS
MARTIN

Intel's super-fast Optane memory and storage will reach enthusiast PCs first

Next year, enthusiast desktops could get the fastest SSDs ever

Intel's Optane products, which promise much faster SSDs and memory, will reach enthusiast PCs in 2016, then spread to other desktops and mobile products.

The news, bound to delight gamers in particular, came from Kirk Skaugen, senior vice president and general manager of the Client Computing Group (CCG) at Intel, during the company's recent annual investor conference.

Optane is the brand name for a new class of memory and storage based on a revolutionary technology called 3D XPoint (pictured). 3D XPoint memory media can be 10 times denser than DRAM, and 1,000 times faster and durable than flash storage. Optane was developed jointly by Intel and Micron.

In 2016, Intel is also set to release Optane solid-state drives and other 3D XPoint memory media products for servers based on the Skylake architecture. The first Optane products are expected to be SSDs and memory DIMMs that plug into memory slots.

Enthusiast desktop users include gamers, who are typically among the early adopters of new technology. Gamers may see immediate benefits of the faster storage and memory with Optane products.

Intel has demonstrated Optane storage operating at approximately seven times faster than its current SSDs. The underlying 3D XPoint technology breaks the bottlenecks affecting current memory and storage
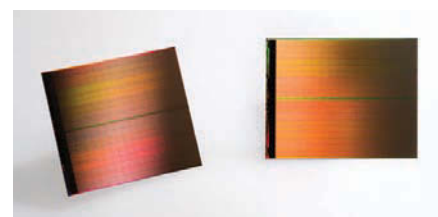
technology. Intel has said Optane is the most significant memory and storage technology since NAND flash was fist introduced 25 years ago.

The 3D XPoint technology is based on technology in which memory cells sit in a three-dimensional mesh. The structure ensures data can be written in small sizes and faster read and write speeds.

OneDrive slashes free storage amount by two-thirds

Microsoft blames a small number of users, who abused OneDrive's limitless storage offering

Microsoft has announced that it will no longer provide unlimited OneDrive storage to Office 365 home subscribers and that it's slashing the amount of free OneDrive storage it provides by a whopping two-thirds.

The reason for ditching the unlimited storage, Microsoft says in a blog post, is that "a small number of users" really went for it by backing up multiple PCs, entire movie collections, and DVR recordings to OneDrive. Microsoft says these users' excessive storage usage amounted to 14,000 times the average. Unlimited OneDrive storage for Office 365 subscribers rolled out just over a year ago in late October 2014.

Microsoft says it wants to stop "focusing on extreme backup scenarios" in OneDrive, and turn its attention to "high-value productivity and collaboration experiences that benefit the majority of OneDrive users." Given the corresponding storage slashes in the lower-cost and free OneDrive tiers, though, the excuse feels like a somewhat

offensive PR-speak attempt to cast blame on users rather than saying something along the lines of "we messed up by offering too much too cheaply," or "we offered you loads of free storage to lure you into OneDrive, and we're taking it away now that you're firmly settled in our cloud."

Storage limits

Microsoft is reducing all OneDrive storage limits to 1TB for Office 365 Home, Personal, and University subscribers. While the new limit goes into effect, current users will have time to pull their data out of Microsoft's cloud. Office 365 subscribers have "at least" 12 months to get their data in excess of 1TB out of OneDrive, according to the tech giant.

Anyone who only wanted Office 365 for the limitless OneDrive storage can ask for a pro-rated refund for the remainder of their yearly subscription.

Office 365 subscribers aren't the only people getting cuts in their storage limits.

Starting in 2016, free users will only receive 5GB of free storage, down from 15GB. Microsoft is also discontinuing the 15GB camera roll storage bonus that allowed mobile users to upload their pictures to OneDrive. Like the free tier, the camera roll will stop in early 2016.

As with Office 365 subscribers, anyone on the free tier and/or using the camera roll will have "at least" 12 months to pull their data out of OneDrive and get below the new limit.

Microsoft is also doing away with the 100- and 200GB OneDrive paid plans. Instead, it will roll out 50GB of storage for $1.99 per month in early 2016. Anyone needing more storage than that can get 1TB and Office 365 Personal for £5.99 per month.

Dropbox and Google Drive charge £7.99 per month for 1TB of storage.

Windows Phone's future is grim, says Gartner

Smartphone users will continue adopting Android and iOS handsets

Gartner is predicting a grim future for Microsoft's Windows mobile OS, saying it won't make its mark in consumer smartphones, remaining relegated to enterprise users. Microsoft's Windows 10 mobile OS is just now reaching devices, but prior versions didn't fare so well. Windows Mobile was in just 5.87 million handsets shipped during the third quarter this year (capturing 1.7 percent market share), declining from 9.03 million (3 percent) in the same quarter a year earlier.

That pales in comparison to Android, which was in 298.8 million units shipped during the third quarter (84.7 percent market share), increasing from 254.35 million (83.3 percent) a year earlier. Apple's iOS was shipped in 46.06 million handsets (13.1 percent), rising from 38.19 million (12.5 percent) in the year-earlier quarter.

The Windows operating system is primarily used in Microsoft's handsets, whose shipments also declined in the third quarter. The company was in third place behind Samsung and Apple, with phone shipments of 30.3 million units, a decline from 43.13 million in the year-earlier quarter.

Worldwide mobile phone shipments totalled 477.9 million units during the third quarter, increasing by 3.7 percent, according to Gartner. The numbers include smartphones and feature phones.

Handset shipments overall rose due to growing demand for affordable smartphones in emerging nations, where local brand names are emerging. Lower-cost handsets typically have slower processors and sacrifice on advanced features found in top-line phones from Apple and Samsung.

Most low-price smartphones carry Android, but Microsoft is making an attempt to put the Windows 10 mobile OS in low-cost handsets by partnering with companies such as Acer.

Samsung remained the world's top smartphone vendor in the third quarter, selling 102 million units, an increase from year-earlier shipments of 93.6 million, and holding a 21.4 percent market share. The release of new Galaxy handsets four months ago helped boost shipments.

Apple's shipments totalled 46 million units (a 9.6 percent market share), growing

from 8.3 percent in the year-earlier quarter. Apple shipped new iPhones at the end of the September, and that will boost shipments for the company's fourth quarter.

Several Chinese companies including TCL, ZTE and Xiaomi were in the top 10. India's Micromax, whose smartphones have taken the country by storm, also made its way into the top 10. Gartner said little-known brands like Oppo and BBK were also flourishing in emerging markets. The little-known brand names are rising as device sales soar in countries such as China and India. ⊠

Windows 7 PCs available to buy for one more year

PC makers will have to stop preinstalling Windows 7 on October 31, 2016.

Halloween 2016 could be especially frightful for Windows 7 fans, as it's the last day PC makers will be allowed to preinstall the aging operating system.

Microsoft recently updated its Windows lifecycle page to include an end date for Windows 7 PC sales. That date is October 31, 2016, which is also the same day that Windows 8.1 PC sales will cease. From then onward, all PCs must come with Windows 10 preinstalled.

The end of sales date for Windows 7 is actually much later than usual for older Windows versions. Usually, the cut-off comes two years after version's successor arrives, which in the case of Windows 7 would have been October 2014. But Microsoft extended those sales indefinitely for the Pro version, likely due to the negative response to

Windows 8. (Some PC makers even used Windows 7 as a selling point, with special promotions on some computers.)

The cut-off date for PC sales doesn't mark the end for Windows 7, however. Businesses will still be able to use downgrade rights to get back to Windows 7. And while mainstream support, such as feature updates, for Windows 7 ended in January 2015, extended support will continue until January 2020. That means you'll still get roughly four years of security patches if you snag a Windows 7 PC before sales cease.

Why this matters: While PC makers are now putting most of their marketing efforts behind Windows 10, today vendors such as Dell and HP continue to sell machines with Windows 7 onboard, even direct to consumers. For users who are more comfortable with the six-year-old operating system, don't like the mandatory updates of Windows 10, or want access to Windows Media Center, the clock is now ticking on a chance to buy new Windows 7 hardware. ⊠

Why we need Nexus phones more than ever

Android manufacturers can't stop mucking up Android. Here's why we still need Professor Google to give everyone an object lesson in how to make a proper Android phone

T he Nexus 6P and 5X (see pages 34 to 39) could be the perfect Android phones we've been pining after for years. Great build quality, a top-flight camera, rapid updates, all wrapped together with a pure and unsullied version of Android.

It's especially that last item that phone manufacturers keep fumbling. You can get an excellent camera with a new Samsung Galaxy S6 or the LG G4. HTC's all-metal One series has always been a leader in the looks department (see page 46). And the Moto X lets you build a device to your liking in a near-stock Android package (Though how often it stays up to date is another matter.)

They are all good phones. But all are susceptible in one form or another to a list of grievances. Slow updates. Preinstalled apps you can't get eliminate (from the device maker and carrier). Interface tweaks that merely change, instead of improve, the Android experience.

These continual problems have convinced me that despite what others may say, we desperately need Nexus phones to lead the way. I'm more optimistic than ever with what Google produced in the Nexus 6P and 5X. Here's why it still needs to teach everyone about how it's supposed to be done.

A Touch of the Wiz

We've railed plenty of times here about third-party software. Samsung's TouchWiz and the custom interfaces from LG and HTC are easy targets. But why is that one of our constant gripes?

Often they don't really add any value. Most of these custom user interfaces unnecessarily change the configuration of the settings, home screen, and other features. Yes, Android is all about openness and customisation, and giving everyone the freedom to do this. But they should actually make things better.

To be fair, sometimes they do. Samsung adds some useful tweaks to TouchWiz. For example, there's a handy checkbox in the drop-down menu to turn on auto-brightness. You can also customise which settings are at the ready from this spot (pictured right).

TouchWiz also lets you uninstall an app from the home screen – something Android finally added with Marshmallow.

Phone makers can, and should, add these kinds of things if they make the experience better. But they don't need to mess with the way buttons and switches look, or turn toggles into checkboxes just because they can. There's no need to switch up the fonts and colours or copy iPhone features like rounded app icons and a Parallax wallpaper (looking at you, Samsung).

Bloatware: still nonsense

While the bloatware situation has somewhat improved, it's still rather terrible. Take this example: on the Galaxy Note 5, you can't install Word, Excel or PowerPoint from the Play Store. You have to get them from Samsung's own Galaxy Apps market.

It's one of those partnerships that is great for Samsung and Microsoft, but terrible for you. That's why when I first fired up my Note 5, I had to constantly tell OneDrive to stop pestering me to back up my photos. Then I had to get rid of Flipboard Briefing, which takes over an entire home screen. It's ridiculous that the standard procedure for setting up a new Android phone is to spend an hour debloating all the apps and services you don't want. Yes, Apple includes apps you probably don't want, but at least all you have to do is drag those into a folder and they're out of your way.

This is another place where OEMs need to look to Google – the company recently sliced out Google+, Play Books and Newsstand from the list of required apps. We need fewer preinstalled applications, not more.

At least Motorola has distinguished itself by sticking to the stock Android interface,

Samsung's drop-down settings menu brings some useful tweaks, but it'd be preferable if it didn't go overboard with them

and making its phones available directly, without carrier bloat (or price overhead). But the yin to that yang has been a string of bad cameras, with the exception being the good-but-not-great Moto X Style. We've said it plenty of times: leave Android alone.

Update madness
The fatal flaw of the Android ecosystem is the unwillingness of OEMs and carriers to deliver timely Android updates. Lollipop has been out for a year, but it's only on a quarter of the Android phones worldwide.

The situation is better with flagship devices, as most have been updated to Lollipop. But it will be several weeks, if not months, before Marshmallow comes to your non-Nexus phone.

It's frustrations like this that send people back to the iPhone. When Apple pushes out an iOS update, it's available for your device that day. Yes, Google has wisely moved its apps to the Play Store and a ton of features to Google Play Services, which it can directly control and easily update. But key functions, such as Marshmallow's new Doze battery-saving feature, come only in new OS updates. And who knows when you'll get one.

The security situation is also still shaky. A recent study from Cambridge points out that almost 90 percent of Android phones are vulnerable, with the update bottleneck of OEMs and carriers chiefly to blame. This is another case where Google

needs to lead the way at shoring up your phone's defences. Google has pledged monthly security updates to its Nexus phones, which are sold unlocked without carrier interference. If this model proves successful, it could further nudge the industry in the right direction.

A great camera and build quality are a must
Last year's Nexus 6 was a disappointment for its excessive size and bad camera. That's a huge pain point for buyers: the camera is usually at the top of the list of wants when I talk to people about smartphones. I have two family members who just switched over to the iPhone for that reason alone. Even though the Galaxy S6 and its siblings have a camera that's arguably as good or better than the iPhone 6s, it's the perception of the iPhone's photographic superiority that resonates with buyers.

The same goes with fingerprint scanners. When people see Touch ID for the first time,

> Last year's Nexus 6 was a disappointment for its excessive size and bad camera. That's a huge pain point for buyers: the camera is usually at the top of the list of wants

they're wowed. Fingerprint scanners are on Samsung's top phones, but we are only finally getting native support in Android Marshmallow. By all accounts Nexus Imprint is lightning fast, which should serve as a model for how this feature out to be implemented. That's especially critical with the reboot of Google Wallet to Android Pay.

The only hardware feature Nexus phones are lacking is wireless charging. That's not on the iPhone yet, so outside of Samsung enthusiasts, it's probably not entered the public consciousness as a must-have. But a great camera is. Fingerprint sensors should be there soon. Nexus phones must be leaders in implementing core hardware components, but quality matters. They have to look and feel good. Pickup trucks are useful, but everyone gets excited about sports cars and performance vehicles.

The right performance for the price
Google really seems to have nailed the price-to-performance ratio this time around. The Nexus 5X is a bargain at £339, especially if it turned out to be as good a phone as the original Nexus 5.

And the 6P is well worth the £449. The Nexus brand needs to get back to what it stood for in the past: good hardware, timely Android updates, and a competitive price. The interface and feature set of stock Android makes it more competitive than ever. Google must show others the way.

Besides, there are plenty of cheap phones out there, like the rather good Moto G. And Samsung is in iPhone territory with its Galaxy S6 and Note line that starts at £600. Nexus should still occupy that middle ground – excellent, stock Android phones at a price that won't break the bank.

Also, with Nexus Protect, Google is finally catching up to Apple when it comes to customer service. The big advantage of an iPhone is that you can walk into an Apple Store anytime and get support. If more people feel like there's help on the line, buying a phone without a bricks-and-mortar store might not be so scary.

Yes, we still need Nexus
Nobody is hitting all of these points except for the Nexus line. Motorola comes close, but with the exception of the Moto X Style, Motorola phones have had a consistently bad camera. And the Style's lack of a fingerprint reader makes using Android Pay a pain. Now Motorola is having issues with software updates, to boot (the company ditched out on any more updates for the 2015 Moto E, which is only nine months old).

Not only do we need the Nexus line more than ever, but we need it to be better than ever. We shouldn't have to give up precious features or great camera quality just to get a clean interface and timely software updates. Google must make Nexus the benchmark for how Android phones should be, the 'aspirational' brand that Pixel is for the Chrome operating system, because pure Android is now good enough to be more than just for developers. ⊠

Version	Codename	API	Distribution
2.2	Froyo	8	0.2%
2.3.3 - 2.3.7	Gingerbread	10	3.8%
4.0.3 - 4.0.4	Ice Cream Sandwich	15	3.4%
4.1.x	Jelly Bean	16	11.4%
4.2.x		17	14.5%
4.3		18	4.3%
4.4	KitKat	19	38.9%
5.0	Lollipop	21	15.6%
5.1		22	7.9%
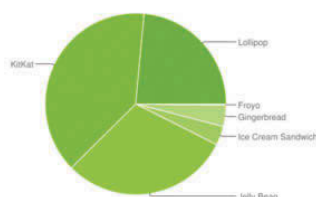
The data was collected by Google during a seven-day period that ended on 5 October. The OS versions are tallied when devices access the Google Play Store

DEREK WALTER

Sky Q previews the future of premium TV viewing

Sky Q is the firm's biggest announcement for years, but there's a lot to take in. Chris Martin reports

At a recent event in central London, Sky made one of its most important and biggest announcements of recent years. Sky Q is the company's new premium service and there's a lot to it.

What is it?

According to Jeremy Darroch, chief executive at Sky: "Sky Q is a brilliant new way for customers to experience TV on their terms. We wanted to reimagine TV, so that it's flexible and seamless across different screens, and to put a huge choice of entertainment at their fingertips."

Availability

Sky Q will launch in the UK and Ireland early 2016. It won't replace existing products, such as Sky+ and Now TV, but will launch alongside them as a premium option. No announcement has been made concerning the price, though it's thought it might push some customers over the £100 per month mark. It's believed it will cost at least an extra £13 per month.

Features and hardware

Since Sky Q has many different elements we're going to split it up into digestible sections to help you get your head round it.

Fluid Viewing

The so-called Fluid Viewing part of Sky Q is all about providing a seamless experience. So you'll be able to do things such as pause whatever you're watching and carry on

viewing in another room, or have different programmes playing simultaneously on up to five screens around the home, while recording four other channels. You'll also be able to transfer your recordings to devices, such as tablets, so you can take them with you – the most-requested feature.

The Sky Q Mini is an additional box that can plug and play into another screen in the house, giving wireless access to Sky Q in other rooms without running cables from the dish

4K

As you might expect, the new Sky Q box supports 4K, though the firm won't launch its 4K services until later in 2016. Sky claims its Ultra HD service will be "the UK's most comprehensive", including sports, movies and entertainment.

Sky Q box and Sky Q Silver

With a new service comes new hardware and there isn't just one box, there are two. As

well as 4K support, they have up to 12 tuners and up to 2TB of storage. The Sky Q Silver is the more powerful of the two, with the regular model offering the ability to record three channels while watching a fourth, and 1TB of storage space. YouTube, Spotify and Apple's AirPlay will also be supported.

Sky Q Mini

The Sky Q Mini is an additional box that can plug and play into another screen in the house, giving wireless access to Sky Q in other rooms so you don't need to run cables from the dish. It features dual-band Wi-Fi, ethernet, optical output and a USB port for future use. When used with the Sky Q Hub (see below), it can also act as a Wi-Fi extender/hotspot, which could prove to be a handy feature for those with larger homes.
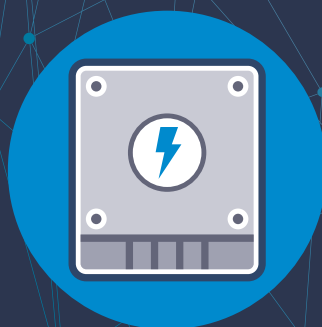

Sky Q Silver
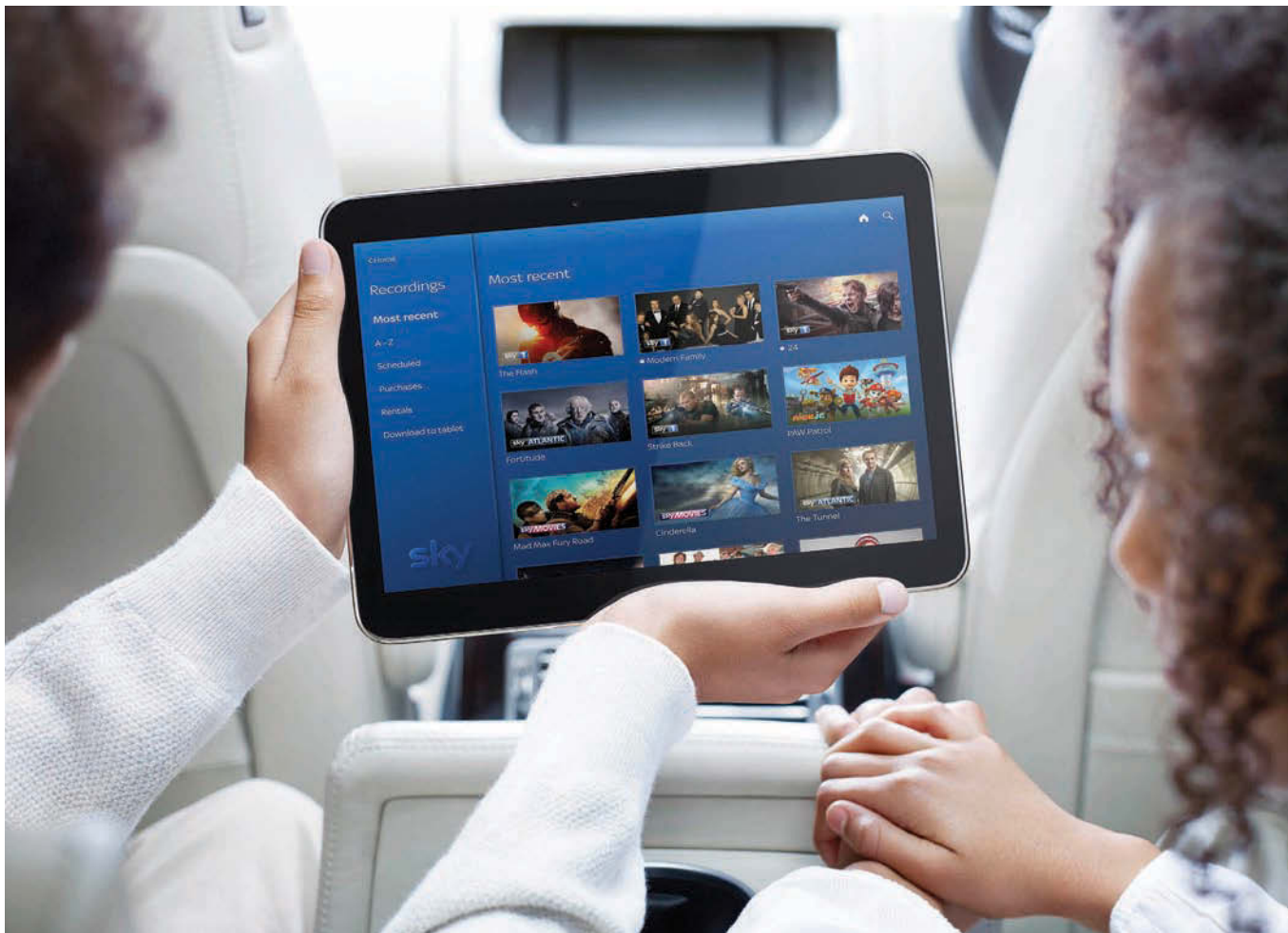
Sky Q Hub

This is the broadcaster's new router and comes with built-in powerline networking technology, so it can use your home's electrical wiring and Wi-Fi to communicate with Sky Q boxes (not compatible with other powerline products).

The Sky Q Hub can turn Sky Q boxes into Wi-Fi hotspots where they sit around the home for better coverage. It supports 5GHz 11ac Wi-Fi with 3x3 MIMO, as well as 2GHz 11.n with 2x2 MIMO.

Sky Q app

The Sky Q app will allow you to take your recordings from the Sky Q box out of the house with you. You'll also be able to use the app to live stream content around the home.

Sky specifies that these features are for tablets, so it seems that this won't work for phones, at least initially.

Touch remote and new interface

The new Sky Q touch remote allows you to scroll and swipe with a touchpad. It also connects via Bluetooth, so you don't need line-of-sight for it to work.

An entirely new service and set of hardware wouldn't be complete without

> The new Sky Q touch remote allows you to scroll and swipe with a touchpad. It also connects via Bluetooth, so you don't need line-of-sight for it to work

a new interface. Sky said it has "tried to simplify how we find and watch all the shows, movies and TV we love".

The Sky Q interface starts off with the new Home Screen, but there are plenty of other areas, including the Sky Store,

Top Picks and My Q. There are, of course, sections such as Recordings.

"The new guide provides a great combination of recommendations – a curated Top Picks selection on the home page, alongside personalised options found in the new My Q section, which are based on what

you have watched at different times of day. My Q lets you pause what you're watching in one room and carry on in another on a TV or tablet. It also lets you easily find and watch the next episode of a series," said a Sky spokesperson.

You can also use the new software to search across multiple areas. One search will look across live, recorded and ondemand content in one go. It will also suggest similar shows you might like at the same time. ⊠

Sky Q Mini

New features coming to 2016 flagship smartphones and tablets

Fed up with your current smartphone? Well there's plenty to get excited about with the Snapdragon 820. Here are the great features a Snapdragon 820-powered smartphone could have. By Chris Martin

Although details about the chip have been floating around the web for a while, Qualcomm has now revealed exactly what advantages and upgrades it will bring. A company spokesperson told us: "The Snapdragon 820 has been holistically designed around enriching visual quality and audio clarity, as well as developing more intuitive ways to interact with devices, to generate deeply immersive experiences."

Specifications

Let's break down the four main components of the Snapdragon 820 which are the CPU, GPU, DSP and LTE modem.

Kyro CPU

An important part of any SoC (system-on-a-chip), the Kryo CPU inside the 820 will bring up to twice the performance and double the power efficiency when compared to previous generations. The 64-bit-capable custom CPU is also the first to be made with a 14nm FinFET manufacturing process.

Adreno 530 GPU

The Adreno 530 offers 40 percent better performance and power efficiency compared to previous generations.

Hexagon 680 DSP

The Hexagon 680 DPS (digital signal processor) is for tasks that can be done faster than the CPU and with less power. For simple things such as playing an MP3, the 680 can double playback time. Qualcomm claims that it can be up to three times faster than the CPU for certain tasks and 10 times more efficient.

X12 LTE

Last but not least is the X12 LTE modem, which provides 33 percent improved performance and 15 percent better power efficiency. Users will be able to, in theory, get 600Mb/s download speeds and 150Mb/s upload speeds thanks to Cat 12 – that's double if you've got a phone with Cat 6 in your pocket. It's also the first to support unlicensed spectrum bands to help with data capacity on networks (LTE-U). There's also 802.11ad for faster line-of-sight Wi-Fi, 11ac MU-MIMO (multi-user), Smart Wi-Fi Calling.
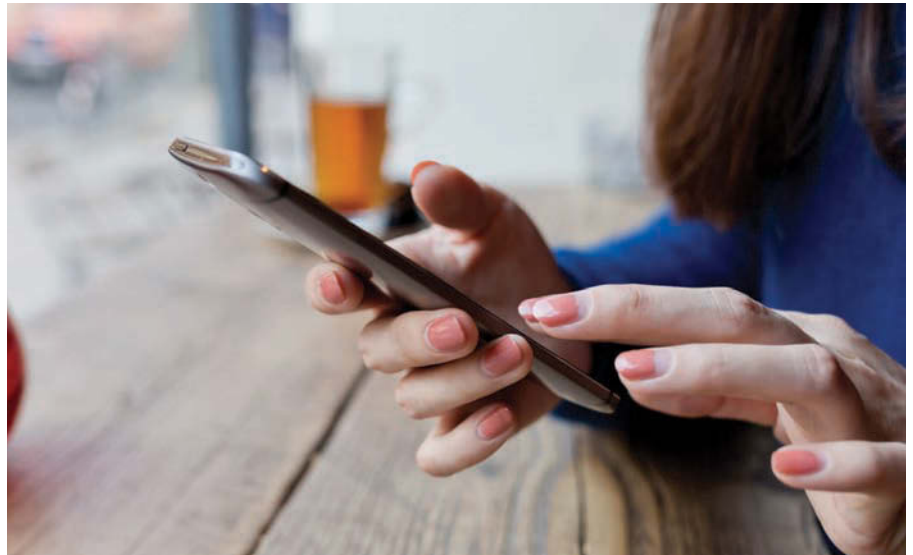
New features

Qualcomm says the processor's connectivity features are unmatched by any other mobile SoC, so let's look at them to see what you're 2016 phone will be capable of. Note that these are just base features of the 820 and some are optional, so manufacturing partners will choose which ones they want to invest time and money in.

Battery life and overheating

These are probably two of the big questions on your lips right now when it comes to the Snapdragon 820. Will it provide better battery life and will it overheat?

According to Qualcomm, the news is good. Since the 820 is more power efficient, the battery life will be increased, while producing less heat. In terms of numbers, the Snapdragon 820 consumes 30 percent less power compared with the 810, which has suffered from some heat issues in a number of phones.

Quick Charge 3.0

Quick Charge 3.0 is designed to be four times faster than normal charging. Compared to previous versions, it's twice as fast as the original and 38 percent more efficient than Quick Charge 2.0.

Qualcomm says it "employs Intelligent Negotiation for Optimum Voltage (INOV), an algorithm that allows your portable device to determine what power level to request at any point in time, enabling optimum power transfer while maximising efficiency."

Visual processing

With phones now offering resolutions up to 4K, visuals are more important than ever. Qualcomm says you can expect photorealistic video graphics thanks to the combined efforts of the Kryo CPU and Adreno GPU. It does this by implementing things such as dynamic reflections, HDR rendering and temporal anti-aliasing.

Snapdragon Scene Detect

This is an interesting technology that Qualcomm says will intelligently work out what you're taking a photo of, detecting

things such as people, sky, sand, and so on. The system can be trained to recognise different things, even a type of food. To do this, it uses the Zeroth neural processing platform and the heterogeneous cores.

The fact that it can detect different image types and scenes means the photos can be automatically organised into those different categories, making your life a bit easier.

Snapdragon Low Light Vision
Low light is where everyone is striving to make improvements and Qualcomm's answer is adaptive brightness and noise reduction. It says the Low Light Vision system can compensate for HDR scene and motion artefacts usually created by camera or subject movement. The firm promises
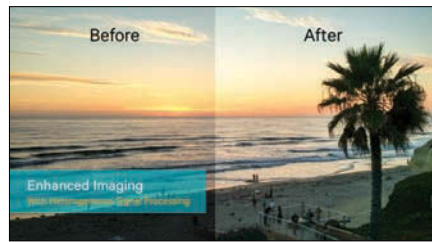
DSLR-like results, without needing kit like a 'proper' lens. Bold claims, then.

Imaging
Intelligent camcorder
Also related to Scene Detect, the Intelligent Camcorder has the ability to recognise and track multiple objects using 'computer vision'. Qualcomm even says it will be able

to pick out your child in order to focus on them instead of anyone else, even across a football field full of kids.

Immersive Audio
Audio is an area often overlooked, but the Snapdragon 820 aims to offer a better experience producing what it calls a "centre of sound that's faithfully sharp and immersive, unmatched on other audio platforms". Immersive 3D sound is also touted for when you're wearing headphones.

Smart Protect
This looks for bad behaviour in software to stop malware before a security vendor has identified it. Qualcomm has taught the Snapdragon 820 what to look out for. ⊠

Google+ updates aim to breathe new life into ailing social network

Google whittled down its Google+ platform to the bone as part of a new redesign that highlights groups and topics. But does the latest batch of changes represent a new beginning for the struggling social network, or the beginning of the end? Matt Kapko reports

C ompanies that build social networks do not have an infinite number of chances to get things right before users lose interest and flee. Google likely ran out of time to achieve its original goal with Google+ (to become the end-all, be-all social network), but the company recently made a significant move to salvage what remains of its once grandiose vision for social.

Google+ has been redesigned, or "reimagined" as the company put it, to focus on the four-year-old social network's strengths. Communities, Google's new take on its former Groups feature, and Collections, the platform's new format for organising posts by topic, are now the most prominent elements of Google+.

An average of 1.2 million users join new Communities each day, according to Google, and Collections is growing even faster. The search giant has slowly retreated from its grand social experiment for years, but the fate of Google+ became even less clear last summer when the company formally abandoned its strategy to shoehorn the platform into other major Google products.

Today's Google+ a shadow of its former self
Google's Photos, Hangouts chat and other features that were once core to Google+ were stripped out and released as standalone
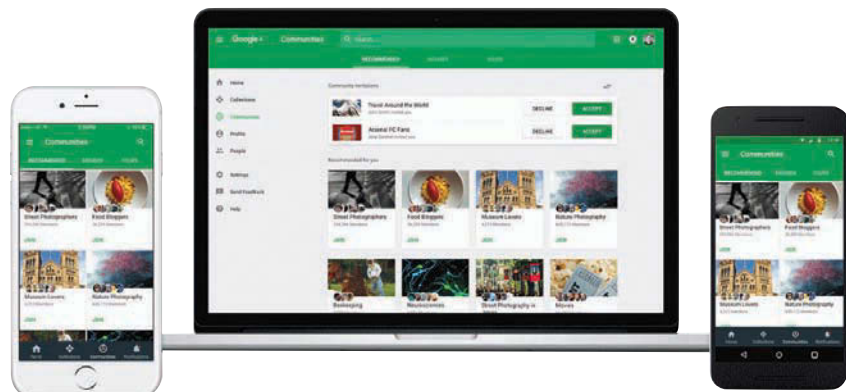
products. The remaining pieces of Google+, along with this latest redesign, suggest Google is no longer interested in building an all-inclusive social platform.

Forrester Research analyst Erna Alfred-Liousas said many of today's successful social networks are designed for specific activities or pursuits. "If Google+ is going to be reinvigorated, focusing on what people enjoy is a good start," she added. "This isn't about competition right now. It is about making sure what they're offering is actually what people want."

Google streamlined the service to focus on what it does best, with a new design that aims to deliver a consistent experience across desktop, Android and iOS devices. You can opt in to the preview of the new

Google+ on the web by clicking the 'Let's go' prompt the next time they log in. Google says updated apps for Android and iOS will be released in the coming days.

Google+ may be on the ropes, but Alfred-Liousas doesn't believe the platform is down for the count. "Though [Google's] first foray into social provided less than stellar results, there are learnings for them," he revealed. "They now have a better understanding of what is necessary to maintain the audience it developed, as well as potentially attract new people."

While Google is positioning these latest changes as a new beginning, it will have to battle a growing market perception that the company has missed its window to regain lost momentum. ⊠

Many routers, modems, and other devices ship without adequate security tests

A large scale security test of firmware images for embedded devices found thousands of vulnerabilities. Lucian Constantin reports

An analysis of hundreds of publicly available firmware images for routers, DSL modems, VoIP phones, IP cameras and other embedded devices uncovered high-risk vulnerabilities in a significant number of them, pointing to poor security testing by manufacturers.

The study was performed by researchers from the Eurecom research centre in France and Ruhr University in Bochum, Germany, who built an automated platform capable of unpacking firmware images, running them in an emulated environment and starting the embedded web servers that host their management interfaces.

The researchers started out with a collection of 1,925 Linux-based firmware images for embedded devices from 54 manufacturers, but they only managed to start the web server on 246 of them. They believe that with additional work and tweaks to their platform that number could increase.

The goal was to perform dynamic vulnerability analysis on the firmware packages' web-based management interfaces using open-source penetration testing tools. This resulted in 225 high-impact vulnerabilities being found in 46 of the tested firmware images.

A separate test involved extracting the web interface code and hosting it on a generic server, so it could be tested for flaws without emulating the actual firmware environment. This test had drawbacks, but was successful for 515 firmware packages and resulted in security flaws being found in 307 of them.

The researchers also performed a static analysis with another open-source tool against PHP code extracted from device firmware images, resulting in another 9046 vulnerabilities being found in 145 firmware images.

In total, using both static and dynamic analysis the researchers found important vulnerabilities like command execution, SQL injection and cross-site scripting in the web-based management interfaces of 185 unique firmware packages, affecting devices from a quarter of the 54 manufacturers.

The researchers focused their efforts on developing a reliable method for automated testing of firmware packages without having access to the corresponding physical devices, rather than on the thoroughness of the vulnerability scanning itself. They didn't perform manual code reviews, use a large variety of scanning tools or test for advanced logic flaws.

This means that the issues they found were really the low-hanging fruit – the flaws that should have been easy to find during any standard security testing. This begs the question: why weren't they discovered and patched by the manufacturers themselves?

It would appear that the affected vendors either didn't subject their code to security testing at all, or if they did, the quality of the testing was very poor, said Andrei Costin, one of the researchers behind the study.

Team's findings

Costin presented the team's findings at the recent DefCamp security conference in Bucharest. It was actually the second test performed on firmware images on a larger scale. Last year, some of the same researchers developed methods to automatically find back doors and encryption issues in a large number of firmware packages.

Some of the firmware versions in their latest data set were not the latest ones, so not all of the discovered issues were zero-day vulnerabilities – flaws that were previously unknown and are unpatched. However, their impact is still potentially large, because most users rarely update the firmware on their embedded devices.

At DefCamp, attendees were also invited to try to hack four Internet of Things (IoT) devices as part of the onsite IoT Village. The contestants found two critical vulnerabilities in a smart video-enabled doorbell that could be exploited to gain full control over the device. The doorbell also had the option to control a smart door lock.

A high-end D-Link router was also compromised through a vulnerability in the firmware version that the manufacturer shipped with the device. The flaw was actually known and has been patched in a newer firmware version, but the router doesn't alert users to update the firmware.

Finally, the participants also found a lower-impact vulnerability in a router from Mikrotik. The only device that survived unscathed was a Nest Cam.

Details about the vulnerabilities have not yet been shared publicly because the IoT Village organisers, from Bitdefender, intend to report them to the affected vendors first, so they can be patched. ⊠

OnePlus X

Smartphone

After making waves with its first two phones, OnePlus is back with its smallest and cheapest device yet. Despite being under £200, the X offers a premium metal and glass design, with a limited edition ceramic model also. It features a 5in screen, 13Mp camera and the firm's own Oxygen OS. Read our review on page 40.

From £199 inc VAT
oneplus.net.com

CHRIS
MARTIN

BlackBerry Priv »
Smartphone

Thought BlackBerry was long gone? Wrong. The Canadian firm has launched a new smartphone in the form of the Priv, which stands for privacy and privilege. The slider has that iconic physical keyboard, gorgeous 5.4in Quad HD display and, shock horror, runs on Android.
£559 inc VAT
uk/blackberry.com

« HP Star Wars Special Edition
Laptop

There's an overwhelming amount of *Star Wars* themed items around, but few of them run Windows 10. As well as a Skylake Intel processor and up to 12GB of RAM, this special edition laptop features a 'battle-worn' distressed design, with 'Galactic Empire' written in the unique *Star Wars* Aurebesh font on the hinge, and iconic Stormtroopers on the keyboard deck. Let's not forget the X-Wing Star Fighter Guidance System style touchpad, either.
£549 inc VAT
hp.com/UKStore

Google Chromecast 2 & Audio
Media streamers
As well as new Nexus phones, Google has brought out a new version of the Chromecast, which has improved wireless connectivity and a handy magnetic round design. More interesting, though, is the Chromecast Audio, which can turn pretty much any speaker in your home a wireless streamer.
£30 inc VAT each
store.google.com

HTC One A9
Smartphone
The first non-Nexus phone to run Android 6.0 Marshmallow is the title claimed by HTC and the new One A9. And yes, it does look like the iPhone to a large extent. This sits alongside the One M9 and features a 5in Full HD screen, fingerprint scanner and a Qualcomm Snapdragon 617 processor. Read our review on page 46.
£419 inc VAT
htc.com/uk

Apple TV (2015)
Media streamer
Taking on the Chromecast and others, such as Roku, is the latest edition of the Apple TV. This year's offering is all about the apps and games. It doesn't support 4K, but does come with a new touch sensitive remote control and support for Siri making things quicker and easier.
£129 inc VAT
apple.com/uk

Pebble Time Round
Smartwatch
Kickstarter success Pebble has finally launched a circular watch, and the company claims its Time Round is "the world's thinnest and lightest". The smartwatch comes in various different colours and styles and features a two-day battery life and an always-on colour display.
£229 inc VAT
pebble.com

Withings Activité Steel
Activity tracker
Offering the style of the original but at a more affordable price is the Activité Steel. As the name suggests, the watch has a stainless steel watchcase, but a silicone strap instead of leather. It still features tracking for walking, running, swimming and sleeping with an eight-month battery life.
£139 inc VAT
withings.co.uk

Tag Heuer Connected Watch
Smartwatch
You might think that £300 for a smartwatch is a luxury purchase, but Tag Heuer has taken things to a new level with its Android Wear watch. It really should have a better name, but the Connected Watch is powered by an Intel Atom processor and features Wi-Fi. The firm's own watch face mimics the Carrera collection, with three interactive dials.
£1,100 inc VAT
tagheurconnected.com

Specifications
12.3in (2736x1824, 267ppi) PixelSense display; Windows 10 Pro; up to Intel Skylake Core i7; up to 16GB RAM; up to 512GB storage; USB 3.0; Mini-DisplayPort; microSD card reader; 11ac Wi-Fi; Bluetooth 4.0; 5Mp front camera; 8Mp rear camera; Surface Pen included; 292x201x8.45mm; 766g

TABLET

Microsoft Surface Pro 4

PC ADVISOR
BEST BUY

Build: ★★★★☆
Features: ★★★★☆
Performance: ★★★☆☆
Value: ★★★★☆

★★★★☆

Microsoft Surface Pro 3 (left) and Surface Pro 4

Microsoft's latest tablet, the Surface Pro 4, has been designed to replace your laptop. Here we look at whether the tech giant has succeeded.

Price and competition
Starting at £749, it's more expensive than its predecessor, but Microsoft has pretty much gone to town when it comes to improvements and upgrades. Although this is the entry-level price, you can spend up to a whopping £1,799 for a top-of-the-range model. That's a lot of money, especially since you'll have to pay extra for the keyboard Type Cover. The Surface Pro 4 certainly isn't a winner when it comes to value.

The iPad Pro starts at a more affordable £679, but that price only gets you a measly 32GB of storage and doesn't include a keyboard or the Apple Pencil, so the Surface Pro 4 doesn't look as bad – it has a minimum of 128GB of storage and the Surface Pen included.

A spanner in the works here is that there are plenty of laptops offering a decent Windows 10 experience for less money, so the Pro 4 isn't necessarily the right purchase for everyone. If you're deciding between the Surface Pro 4 and a MacBook Air, for example, the latest models from Apple also start at £749 and, come with everything

you need. For that price you get a smaller 11in size, though.

Design
Initially, you could easily mistake the Pro 4 for the Pro 3 (see below), but on closer inspection there are some significant changes that make a big difference to the overall experience.

It's thinner and has a larger screen without a bigger overall size thanks to thinner bezels. Microsoft said that it's as thin as it can get without being forced to get rid of the USB port – and we would have been disappointed if the firm had chosen thickness over the USB.

Just 8.45mm is impressive for a device with the kind of high-end specifications on offer here. All of this also means the device is lighter at 766g for the Core M model – this is because it doesn't require a fan, so you can add 20g if you opt for a Core i model.

You wouldn't want to use it for long periods of time in one hand, but it does make a difference overall with handling and carrying. Let's face it, the Surface is has been designed for use on a flat surface.

Otherwise, things are pretty similar with the same design as the Pro 3, including the kickstand, camera placement and port placement. The thinner bezel

around the screen means the touch sensitive windows button is gone, while the volume rocker is now on the top next to the power key.

This is so that the Surface Pen, still included with the tablet, can be attached magnetically to the left side. This is a lot better than the Surface Pro 3, which allowed you to attach the Pen on the right side, though, the hold was very weak and it covered the power port.

Hardware

The screen on the Surface Pro 4 is larger than that of its predecessor, though the size of the tablet hasn't increased. It's jumped a little from 12- to 12.3in, which isn't huge but does make a difference. Also important is the resolution, which is now 2736x1824 resulting in a crisp and clear pixel density of 267ppi.

As you might expect, the Surface Pro 4 comes with Windows 10 Pro and it looks great on the PixelSense display. Overall, it's one of the best we've seen on any laptop or tablet offering excellent all-round performance. There are top-notch viewing angles, plenty of brightness, great contrast and accurate colours – the list goes on.

Microsoft has listened to the demands of its customers and provides up to 16GB of RAM and up to 1TB of storage for its top-of-the-range model, so power users will be pleased. Of course, those with lower requirements can simply choose a lower-spec model. Things start at 4GB of RAM with a 128GB SSD and improve the more you're willing to spend.

Unfortunately, the 1TB model is not currently available in the UK, so the highest spec model you can buy comes with 512GB. This is a real shame as it's a big feature of the Pro 4, we're hoping that things may change in the near future. We received the following statement from Microsoft on the subject: "We do not comment on pending market availability. That said, we have taken and will continue to take a measured and phased approach to Surface Pro 4 availability to meet customer demand and partner expectations."

Inside the new slender frame of the Surface Pro 4 is a sixth-generation Skylake Intel Core M3 processor, though could get a Core i5 or Core i7 if you wish. That's a lot of power on offer inside a 12in

tablet, but as mentioned earlier, you've got to pay a decent chunk of money if you don't want the entry-level model.

The Surface Pro 4 has USB 3.0, a Mini-DisplayPort and a microSD card reader. The front camera remains at 5Mp, though the rear camera has been upgraded to 8Mp should you find cameras on a tablet useful – arguably the front camera would be more suited to the enhancement for video calls.

Those are the core specs, but it's also worth noting that the Surface Pro 4 comes with 11ac Wi-Fi and Bluetooth 4.0 once again.

Performance

Microsoft claims the device is 50 percent faster than a MacBook Air and 30 percent quicker than the Surface Pro 3.

Our review sample came with a Core i5 processor, 8GB of RAM and 128GB of storage. We put it head-to-head with a Core i5 Surface Pro 3. We can't say we've seen a 30 percent improvement, but the Pro 4 is certainly better than its predecessor. On the MacBook front, as you can see from the table, it's not 50 percent faster compared with a Core i5 model from 2013 – at least in a Geekbench 3 benchmark which primarily tests the CPU.

Benchmark figures (right) are one thing, but real-world usage can often be very different. On this front, we can vouch that the Pro 4 is a speedy machine indeed.

PCMark 8 Home

Surface Pro 4	2682
Surface Pro 3	2174

0, 400, 800, 1,200, 1,600, 2,000, 2,400

Geekbench 3

Surface Pro 4	6721
Surface Pro 3	5532
iPad Pro	5498
MacBook Air (2013 Core i5)	5169

0, 1,000, 2,000, 3,000, 4,000, 5,000, 6,000

GFXBench T-Rex

Surface Pro 4	47fps
Surface Pro 3	36fps
iPad Pro	59fps

0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55

GFXBench Manhattan

Surface Pro 3	21fps
iPad Pro	34fps

0, 5, 10, 15, 20, 25, 30
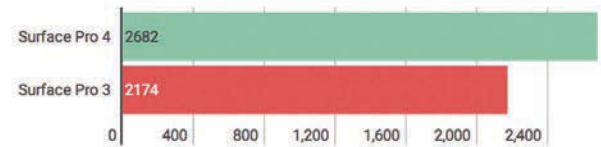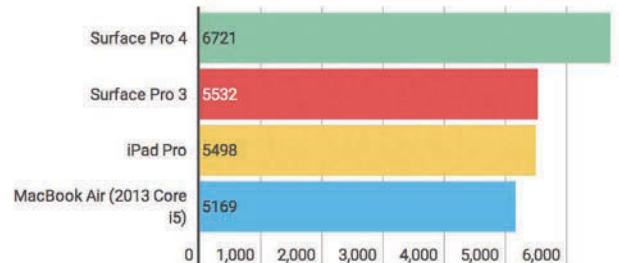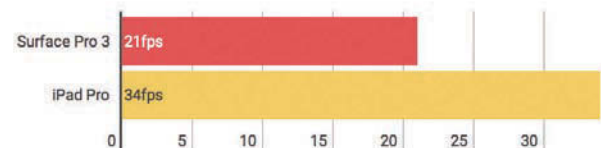
GFXBench Manhattan enhanced

Surface Pro 4	14fps
Surface Pro 3	17fps

0, 2, 4, 6, 8, 10, 12, 14, 16

Microsoft touts a battery life of up to nine hours of video playback – that's the same figure given for the Pro 3, so there's no benefit in upgrading on this front.

Pen and Type cover

As usual, the Surface Pro 3 come with a Surface Pen – the digital stylus now comes in five colours and attaches magnetically. The stylus also offers 1024 levels of pressure and has an eraser on the end. Pressing and holding this activates

pitch) and a 1.3mm travel for a better typing experience that we noticed immediately, and the trackpad is now glass backed and 40 percent bigger, too. It's smooth, responsive and a joy to use.

We can hardly express how much better the new keyboard is and you really notice the improvement when you go back to the old model and struggle to even type your name. It helps bring the Pro 4 one step closer to becoming a tablet that can replace your laptop, because it

Laptop replacement

Microsoft's big claim about the Surface Pro 4 is that it's "the tablet that can replace your laptop," so we wanted to address this question as well as giving you our final verdict.

The short answer is yes, but that's not the full story. The Pro 4 is an amazing device that over the years has been tweaked, honed and tuned into something thin, light and powerful. As good as the Pro 4 is, it isn't the best choice for everyone.

Despite its portability, the design is still more awkward than a normal laptop; for example, when you use it on your lap. It's also very expensive even for the cheapest model, plus the essential addition of the Type Cover, so that's another barrier. When it comes down to it, a traditional clamshell laptop might still be a better choice.

> ## We've found the new Surface Pen to be a lot better than its predecessor and the good news is that you can use it on the Surface Pro 3

Cortana, which is handy while pressing it will open OneNote.

We've found the new stylus to be a lot better than its predecessor and the good news is that you can use it on the Surface Pro 3 - it just won't attach with the magnets.

The Type Cover is an essential piece of the Surface Pro puzzle and the new model offers various upgrades. It costs an extra though, so you'll need to add £109 to the overall cost.

It's been improved with more space between the keys (a 19mm

feels comfortable to use whereas the Pro 3's keyboard took a bit of getting used to.

You may have spotted that some models also have a fingerprint sensor next to the trackpad for added security – these are designed for the Pro 3 since the Pro 4 supports facial recognition (Windows Hello). However, like the 1TB model, this is available only in the US.

The good news for Pro 3 owners is that the new Type Cover is fully compatible, so you can upgrade without buying the new tablet itself.

Verdict

There's a great deal to like about the Surface Pro 4. The design is thinner and lighter, the screen is beautiful, there's plenty of power available, the new Surface Pen is better and the Type Cover is a vast improvement on the last one. However, the design is awkward at times, it's more expensive that a lot of laptops and the Type Cover, which you'll pretty much need, isn't included. ⊠ **Chris Martin**

Specifications
12.9in (2732x2048, 264ppi); Apple A9X processor; 4GB RAM; 32-/128GB onboard storage; iOS 9.1; LED-backlit IPS LCD, capacitive touchscreen, 16M colours, pixels, Wi-Fi 802.11 a/b/g/n/ac, dual-band with MIMO; Bluetooth 4.2; 8Mp, 1.2Mp cameras; 307.7x220.6x6.9mm; 713g (723g Wi-Fi plus cellular)

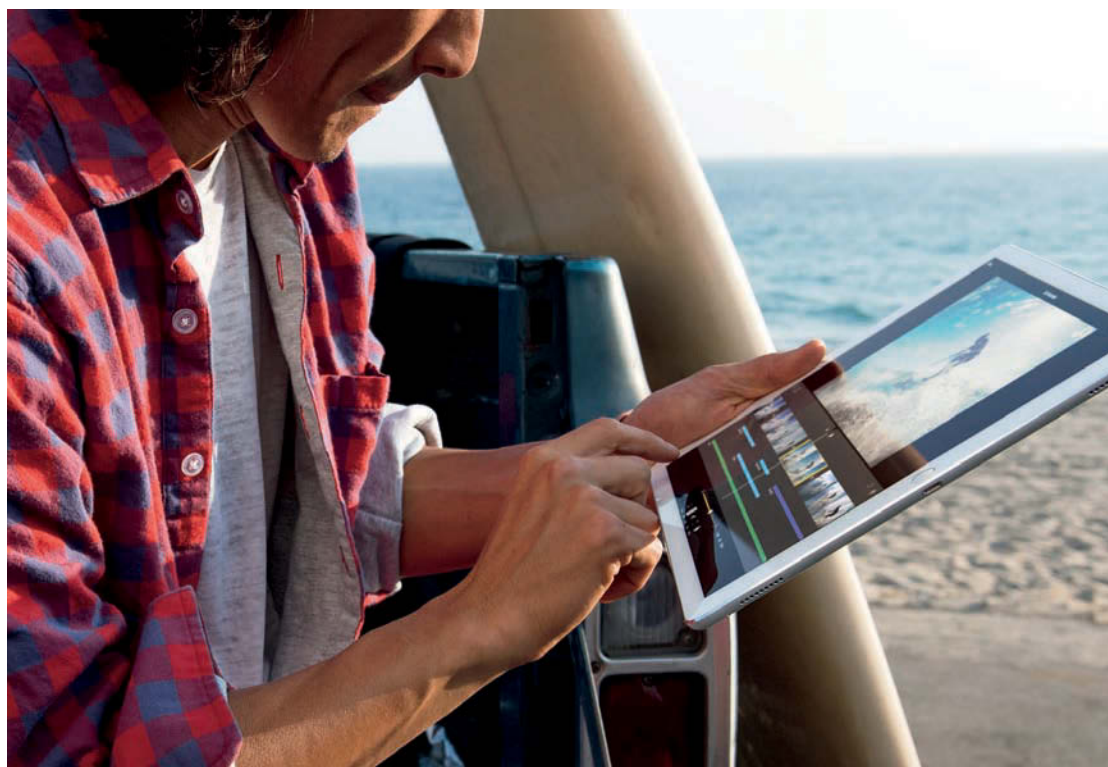|	
Build:	★★★★☆
Features:	★★★★☆
Performance:	★★★★⯪
Value:	★★★⯪☆

★★★★☆

TABLET
Apple iPad Pro

The iPad Pro was rumoured for more than a year: a bigger tablet that would let you multitask properly, with the space to run two apps side by side. A device on which you could be productive, creating and not simply consuming content.

Price and availability
As well as being the biggest, this is also the most expensive iPad ever. Prices starts at £679 for the 32GB model, and jump to £799 for the 128GB option. There's nothing in between, so if you think 32GB isn't going to be enough, tough luck. There's also a cellular model which comes only in 128GB guise that costs £899 – the customary £100 premium on top of the equivalent Wi-Fi only model. But don't forget you also get a GPS receiver with the cellular version.

No accessories are provided, so if you want a Pencil for more accurate drawing or selection, that's an extra £79 and there's currently a four- to five-week wait for delivery. It's the same delay if you want a keyboard, which costs £139.

Design
Since the design change which began with the iPad mini, every iPad has in essence looked the same. It's

no different with the iPad Pro. It's exactly what you'd expect to get if you could magically super-size an iPad Air 2.

It weighs 713g – roughly the same as the original iPad – and although it feels heavy compared to an Air 2, it also feels remarkably light for its size. At 6.9mm thick, it's thinner than you'd expect, too.

Despite all this, there's no flex in the aluminium chassis or screen when you pick it up, even if you grip it only on one edge or corner. It's uncomfortable to hold for very long with one hand, so this is very much a lap or desk-based tablet.

In line with other recent iPads, there's no mute/rotation lock slider, so you have only sleep/wake and volume buttons. On the lefthand side as you hold it in portrait mode are three flush connectors that talk to the optional keyboard (£139) and are available for third-party keyboards and other accessories.

The other change is the quad-speaker system. The speaker-in-each-corner approach means the iPad Pro can emit stereo sound no matter, which way round you hold it, and it automatically switches as you rotate from portrait to landscape. Regardless of how you hold it, the upper two speakers emit treble

frequencies, with the lower-most pair handling lower frequencies. We hesitate to say bass, because there's a limit to what the tiny drivers can handle. While the volume is impressive – three times the output of the iPad Air 2 – it's still not the well-rounded sound that you'll get from a decent pair of headphones.

As you'd expect, there's a Touch ID sensor for unlocking and using with Apple Pay, but it's the first-generation version and noticeably slower to recognise a fingerprint than the iPhone 6s.

Display
At 12.9in, the screen bigger than the 12in MacBook Air and 12.3in Surface Pro 4 (page 24). It's also a little over 3in bigger than the iPad Air 2, yet you get almost twice the real estate (78 percent). The short edge is in essence as long as the long edge on an Air or Air 2, so it's like having two 9.7in iPads side by side. That's great for multitasking, but it's also great for just about everything including websites, viewing and editing photos and video, playing games and generally all the things you already use a tablet for.

It comes into its own with apps optimised for the iPad Pro, especially those with take advantage
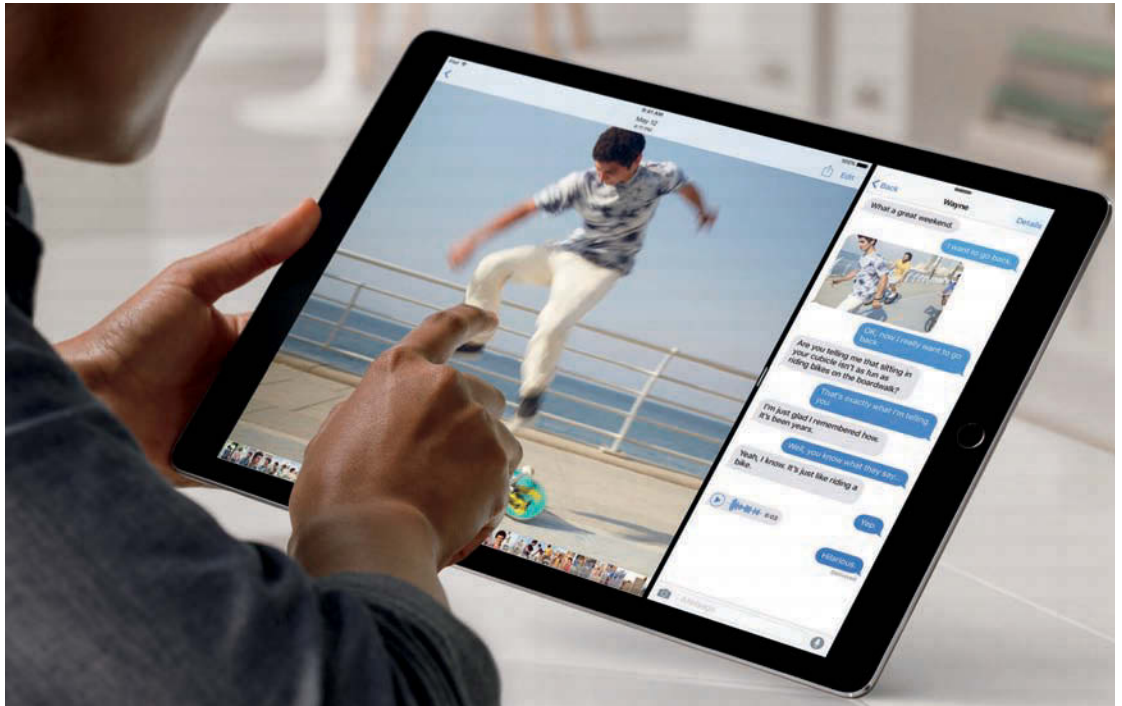
of the high resolution of 2732x2048. Many iPad apps are optimised for the 2048x1536 resolution of every other current iPad, so are scaled up on the iPad Pro. It has the same 4:3 aspect ratio, of course.

The screen is an IPS LCD panel but is subtly different to other iPads – such as the mini 4 – as the pixels are photo aligned rather than mechanically aligned. Will you notice the difference? No, but it means better contrast than it would otherwise have. Other technical advances make the screen more power efficient, too.

What you'll notice when you first use the iPad Pro is just how sharp everything looks. The mini 4 may have a higher dpi – 326- vs 264ppi – but at normal viewing distances you still won't see the pixels. The colours are pretty much as accurate as the excellent iPad mini 4, and it's almost as bright (425- vs 450cd/m² on the mini 4). There's an anti-reflective coating which doesn't seem quite as effective at the mini 4's but the screen is likewise fully laminated.

Overall, it's a fabulous screen that's a joy to look at. If you wanted to be critical, you could moan that it lacks the 3D Touch capabilities of the iPhone 6s, but maybe that's something Apple will add to the next version.

Performance
A great screen would be nothing without top-notch performance

and the A9X processor delivers it in spades. In Apple-relative terms, it's twice as quick as the iPad Air 2, which was already a powerhouse. It's twice as quick in terms of both the CPU and GPU, and when it comes to graphics performance that's crucial. With more pixels to drive, you need more computing power.

In all the apps we tried, performance was superb. Whether you're scrolling around a complex wire-frame model in AutoCAD or retouching photos in Pixelmator, there's never a judder or delay. Really, though, it's just early days in terms of apps and games: the best is surely yet to come.

If you're a video editor, the iPad Pro can handle three streams of 4K video from your iPhone 6s and playback in real-time, even if transitions and effects are applied. That's something you just can't do on the iPad Air 2.

Apple claims 10 hours of battery life, which is the usual figure for iPads. The 38.5Wh battery has 41 percent more capacity than the 27.3Wh cell in the Air 2, and while we haven't yet finished our battery tests, we're confident it will last a full working day.

Apple Pencil and Smart Keyboard
Apple doesn't want prospective buyers to get bogged down with specification details, though. Instead, it wants you to focus on

what you can actually achieve with the iPad Pro. That's one of the reasons it has launched two new accessories: the Pencil and the Smart Keyboard.

The Pencil works a lot like Microsoft's Surface Pen, detecting pressure, tilt angle and where it is on the screen. It works via Bluetooth, and asks to pair when you plug it into the iPad's Lightning port, a neat touch. The iPad can also charge the Pencil, but an adaptor is included in the box so you can use the iPad's charging cable to charge it instead.

It should last for 12 hours of continuous use, but if you do find you need a quick top-up, 15 seconds of charging provides half an hour of use. The Lighting connector is longer than usual so it will plug into your iPad even if it is in a case.

The Pencil works in apps which support it – not all do yet – and the system is intelligent enough to know when you're resting your palm on the screen to write or draw and ignore it. Apps can support both Pencil and touch at the same time, so in the newly updated Notes app you can use two fingers to bring up a ruler and use the Pencil to draw a straight line along its edge.

The Pencil is a particularly useful tool for artists, of course, but it's also handy if you need to annotate PDFs, sign documents, or sketch a diagram or concept. And it's fun.

It's a little pricey, and it's frustrating that there's no storage

for it on the Apple-designed cases. It's not magnetic and it doesn't have a clip to secure it in your shirt pocket. Nor does it have any buttons and you can't flip it over and use the other end as an eraser.

The Surface Pen has all those features and it's bundled with every Surface Pro 4. Apple says you don't need a Pencil to use the iPad Pro, so those who don't want one don't have to pay for one. It has one trick up its sleeve, though. It's weighted so that it doesn't roll off an uneven desk and it always stops with the Pencil logo facing upwards.

We've a few complaints about the keyboard, too. As well as price, which is steep, there's currently only a US layout option (so no £ for UK users). Although the design is undeniably 'nice' it holds the iPad at only one angle. Again, the Surface Pro wins here with a fully adjustable stand and backlit keys, which the Smart Keyboard lacks.

It's not all bad news. The clever keys are shallow but offer decent feedback. And they're large enough to touch type on. iOS 9 has more support for keyboard shortcuts, too, so you can switch between apps, cut and paste and do many more things without having to move your hand away from the keys.

Some have bemoaned the lack of an extra row of keys – the controls you get on a MacBook including volume and brightness – but some of these are shown along the bottom of the screen in certain apps. That's close enough to tap while typing so it's easy to add formatting to text, for example, in Word or Pages.

It can't replace your laptop

It's hard to review the iPad Pro without comparing it to its rivals. The most obvious is the Surface Pro 4, of course. We've already mentioned the Surface Pen, but the tablet itself is impressive. The screen may be slightly smaller, but it's in not inferior to the iPad's. It's better in some respects, and if you need a two-in-one for work where colour accuracy is paramount, the Surface Pro 4 just pips the iPad Pro.

It also offers other advantages such as the ability to run the full catalogue of Windows software, a microSD slot for extra storage, a video output for driving a second monitor and a full-size USB port for connecting myriad other devices.

The point here is that the Surface can replace your laptop. It might not be a perfect replacement, but it can do the job. The iPad Pro is not a MacBook replacement. Apple is clear on that point, with Tim Cook recently reiterating a point he made back in 2012 that combining the iPad and MacBook wouldn't work: it wouldn't offer the best of both laptop and tablet worlds.

We're inclined to agree, and have made the same point every time we've reviewed a Surface. There's always a better laptop you can buy for the same money.

Some people might find the iPad Pro can do everything they need it to and cease to use their MacBook or PC laptop, but others will quickly realise there's no way it can. Simple things like the lack of Flash support mean that you just can't use the websites you need to in order to do your job, book a holiday or whatever. For us, the iPad Pro would make the ideal travel companion, but the fact that parts of our CMS still rely on Flash and Silverlight plugins means we'd still have to take a laptop to upload reviews.

It's still a pain to enter data into an Excel spreadsheet, and a pain if you need to print but don't have an AirPrint printer. And although it's great to edit video in iMovie, this isn't a 'Pro' app: Apple needs to make Final Cut available for the iPad Pro. The old user accounts issue also rears its ugly head: you can't let someone use your iPad Pro in a guest mode. When you unlock it, they have access to everything.

Returning to the comparison, the cheapest Surface Pro 4 is £749. Once you add a Pencil, the cheapest iPad Pro is £758. But if you want to match the base Surface Pro 4's 128GB of storage, the real comparison price is £878.

Verdict

At £679, few people will buy the iPad Pro instead of an iPad Air 2. It does justify that extra expense with a great screen, plenty of power and the possibilities it offers, though.

Regardless of price, 32GB of storage will prove too limiting for most people and even if you stretch to the 128GB version you'll probably want the Pencil and/or keyboard, and they are not cheap. Add the

Geekbench 3
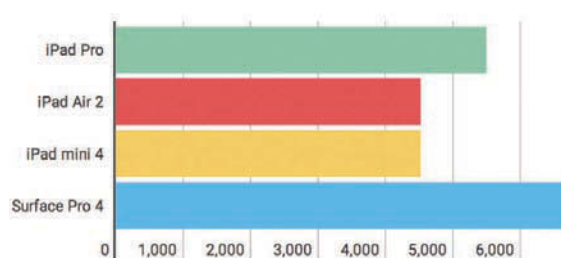
GFXBench Manhattan
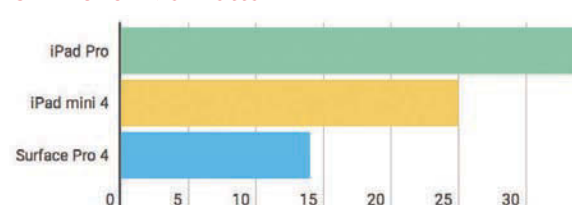
GFXBench T-Rex
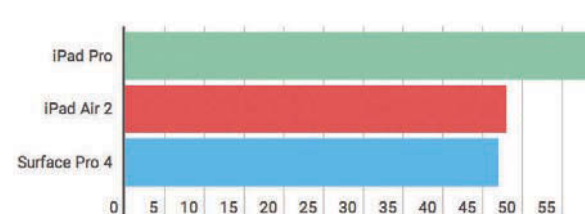
Battery life
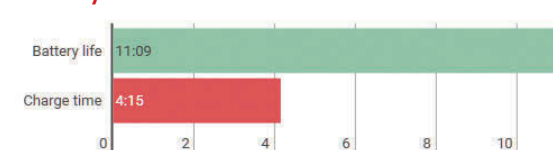
silicone rear cover (£65) and the total bill does begin to smart.

And it sounds obvious, but as with the Plus version of the iPhone, it's bigger and heavier than the iPad Air 2. Unless you've already tried one, you really should go to an Apple store and hold one to understand exactly how bulky and hefty the new tablet really is.

If you're ready to move to a bigger screen and are prepared to accept the associated costs, then the Pro is a great choice. Just don't expect it to replace your laptop. ☒ **Jim Martin**
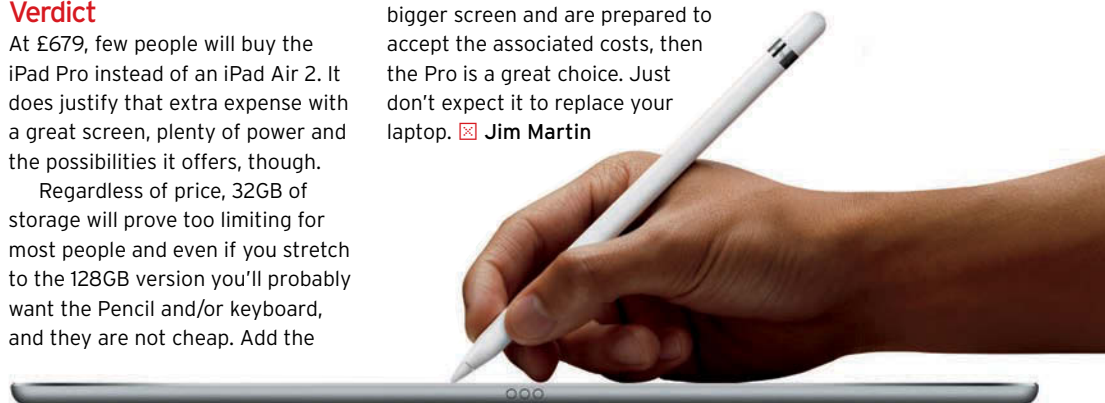
Microsoft Surface Pro 4 vs Apple iPad Pro

No-one expected Apple to announce an iPad Pro at an iPhone launch event, much less that Microsoft would also appear on stage. But it was no dream, and the iPad Pro's closest competitor is Microsoft's new Surface Pro 4. Both tablets run Office and both have physical (optional) keyboards, but which should you buy? You may have read our individual reviews already (pages 24 to 29), but here let's look at how they compare with each other in more depth.

Software

Let's deal with this first as it's the most controversial aspect. Some people will prefer Windows, while others will like iOS 9. There are pros and cons of running a desktop OS on a tablet, which means there's no obvious 'winner' in that sense.

But if you view them as tablets first (and if you will mainly use them as a tablet), the iPad would be the obvious choice. It runs an operating system that's dedicated to a mobile device, and therefore has no impossibly small buttons and controls that are designed to be used with a keyboard and mouse. It's fingers (and thumbs) all the way.

Or almost all the way, because there's the new Apple Pencil, which we'll get to a bit later.

Fortunately, the Surface Pro 4 isn't saddled with Windows 8. Windows 10 improves the experience of switching between laptop and tablet modes (Microsoft calls this Continuum) and should also improve the selection of tablet-style apps available in the store.

But apps are a sore point for the Surface because while – undoubtedly

In Windows' favour, though, is the vast catalogue of desktop software that will run happily on a Surface Pro 3 and 4. iPad owners might have a smug look now that Office and Adobe apps have come to their tablets, but Surface Pro users can install the full versions of Photoshop, AutoCAD, Adobe Premiere and everything else. As we said, there are pros and cons.

Connectivity

Because the Surface Pro 4 is designed to replace a laptop, they have a full-size USB 3.0 port, a microSD card slot (a pain if you want to read full-size SD cards) and a mini DisplayPort output. You could attach a USB hub and connect a full-size mouse, as well as a hard drive or printer at the same time. DisplayPort isn't ideal if you need an HDMI output, but you can buy an adaptor or HDMI to mini DisplayPort cable.

And thanks to the dedicated docking stations available, you need make only one connection when you get back to your desk.

It's harder to use the iPad Pro as a laptop replacement in the same way. It has only a Lightning connector for input and output, which means it's harder to connect to a projector, harder to print and harder to quickly share files with others. All of these things are possible, but either require adaptors, compatible peripherals or the cloud.

> ## Windows 10 improves the experience of switching between laptop and tablet modes and should also improve the selection of tablet-style apps

Having full-blown Windows on the Surface Pro means you can do anything you can do on a desktop PC. You can attach USB peripherals, including a mouse or a hard drive, and you can connect a second monitor. This will make it a better laptop replacement than the iPad Pro in some people's eyes.

– developers will be cursing Apple for introducing yet another screen size and resolution for the iPad Pro, existing apps designed for other iPads will scale up and run on the new tablet, albeit much larger than necessary. And the huge selection in the App Store puts Microsoft's paltry collection firmly in the shade.

Display and stylus

The Surface Pro 2 had a puny 10.6in screen that was simply too small for most people. Even the upgrade to 12in with the Pro 3 wasn't enough: the iPad Pro at 12.9in is about right in our opinion. The Surface Pro 4 sits between the two at 12.3in.

Apple's tablet has a resolution of 2732x2048 compared to 2048x1536 of previous iPads. The pixel density remains the same at 264ppi.

The Surface Pro 4 has a 2736x1824-pixel screen, meaning it's a wider aspect ratio than the iPad. That's the same 3:2 ratio as the Surface Pro 3 (the iPad has the usual 4:3 aspect ratio).

Both have excellent screens: bright, with great contrast and colours. In our tests, the Surface has marginally more accurate colours, but the iPad's are almost as good.

The Pro 4 comes bundled with the latest version of the Surface Pen, detecting 1,024 levels of pressure. Its tips are interchangeable and there's an eraser on the end. Solving the issue of storage, it's magnetic and can be 'stowed' on the top edge of the Surface Pro 4.

Apple's Pencil is also active and has built-in sensors and a battery. Unlike the bundled Surface Pen, it's an optional extra, and can also detect force and tilt angle. Both have very low latency and are about as close to 'real' drawing as you can get with a digital screen, although which is the 'best' will depend upon which app you use.

The Pencil doesn't have any buttons, though, and there's no holder for it on the iPad or Apple's Smart Keyboard, so it's not quite as practical as the Surface Pen.

Talking of keyboards, these are optional on both tablets, but Apple's is more expensive at £139. Microsoft charges £109 for its much improved Type Cover which, let's not forget, is backlit and has a trackpad.

Apple's keyboard has no trackpad. Some would argue it doesn't need one, but for certain apps it would be nice. It also has one fixed angle, whereas the Surface Pro 4's kickstand can be set to just about any angle – even if no keyboard is attached.

Moving on to cameras, the front camera is arguably the most important on a tablet. Not for selfies, but for Skype and conferencing. The Surface Pro 4 has a 5Mp sensor, while the iPad Pro has a 1.2Mp 'FaceTime HD' camera. This is likely to be the same 1.2Mp camera as that found in the iPad Air 2 rather than the upgraded version in the new iPhones. Microsoft's tablet may capture more detail, but as anyone who's used Skype or FaceTime will know, it's the speed of the connection between you and the recipient of the call that's the biggest factor in determining quality anyway.

Price

The cheapest Surface Pro 4 costs £749 (128GB, Core m3, 4GB) and rises to £1,799 (512GB, Core i7, 16GB). Currently, the 1TB version is not available in the UK.

The 32GB iPad Pro costs £679 in the UK, but the Pencil costs an extra £79, making the comparable price £758 for the entry-level model.

Opt for the 128GB iPad Pro and you'll pay £799. Add another £100 for the cellular model, which is available exclusively in 128GB guise.

Verdict

When we reviewed the Surface Pro 3, we concluded that it was the best yet. It's the most portable of laptops and an acceptable tablet. Nothing has changed with this update. The Surface Pro 4 is an evolution and, apart from the higher screen resolution (and better-quality screen) and new processors, doesn't offer too many compelling reasons to buy one over the cheaper Pro 3, or upgrade if you already have one.

With the iPad Pro, it's the best yet in some ways – it's the most powerful iPad and has the biggest, highest resolution screen – but it may not be the best choice for everyone who wants an iPad. It's almost the opposite of the Surface Pro: a fantastic tablet and an acceptable laptop. Almost, because it's stretching the truth to call the Surface a fantastic laptop. It does an admirable job, and is a better laptop than iPad Pro, but you can buy a better laptop than the Surface Pro 4 for less money. ⊠ **Jim Martin**

Specifications
15.6in (3840x2160, 282ppi) IGZO gloss touchscreen display; Windows 8.1 (free upgrade to Windows 10); 2.2GHz Intel Core i5-5200U (2.7GHz Turbo) 2C, 4T; nVidia GeForce GTX 950M with 4GB DDR3 RAM and Intel HD Graphics 5500; 12GB (1x 8GB, 1x 4GB) 1600MHz DDR3 RAM; 1TB 5400rpm SSHD; gigabit ethernet; 802.11ac, 1x1 MIMO; Bluetooth 4.0; BD-RE/DVD±RW, tray-load optical drive; 3x USB 3.0; HDMI; Kensington Security Slot; SDXC card slot; stereo speakers; 0.9Mp webcam; built-in mic; 3.5mm headset jack; 44Wh lithium-ion battery, non-removable; 90W mains charger with IEC C5 inlet; 380x257x23.7mm; 2.33kg

Build: ★★★½☆
Features: ★★★★☆
Performance: ★★★½☆
Value: ★★★★☆

★★★★☆

LAPTOP
Toshiba Satellite P50T-C-109
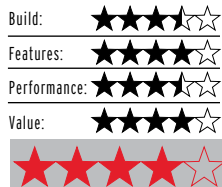
Toshiba's P50T bears the Satellite name of its cheapest consumer laptops, but this model has price and components that place it toward the top of the mid-range category.

It's a 15in model with a UHD 4K touchscreen display, built around a partly metal-clad chassis to improve its looks and resilience. The back and top of the lid have a veneer of brushed aluminium with a champagne finish, above a textured black plastic underside.

While the 44Wh battery is not readily removable, it can be released with two screws. A legacy of the screen's touch sensitivity and high resolution is lousy battery life, just three hours 20 minutes in our tests.

The screen has visibility issues; not from the matrix, which is a UHD IGZO offering from Sharp, but from the absence of reflection-reducing treatment and consequent high-gloss reflectivity. Also apparent was a sparkling grain structure visible in light areas. It measured well, though, covering 97 percent sRGB gamut, 74 percent Adobe RGB, and with an excellent contrast ratio up to 770:1. Colour accuracy was outstanding too at 0.78 average Delta E.

Powering the P50T-C-109 is a dual-core Intel Core i5 at 2.2GHz, backed with 12GB memory and 1TB hybrid disk drive including a sliver of flash memory. Graphics are courtesy of nVidia GeForce GTX 950M, a GPU that allows Windows gaming up to full-HD resolution at least.

Batman: Arkham City averaged 48fps at this resolution and High detail, falling to 36fps at maximum Extreme. Even Metro: Last Light could play at High detail (35fps) while Tomb Raider was still usable at Ultra detail (33fps) if not Ultimate (23fps). Forget about gaming at native UHD resolution though.

The P50T also features a Blu-ray drive able to write and read BDs besides DVD media. Its tray kept popping out whenever the laptop was picked up, though.

Connectors are typical for a mid-range model, with three USB 3.0 ports, ethernet and an SD card slot, though only one video output, HDMI 1.4, limited to 1600p/60. It's unlikely you'd want to connect a second 4K display, but if you do, this is going to be a problem. A 2560x1440 screen will be fine, though.

While the laptop lands with Windows 8.1, our sample had been changed to 10, and a Cortana button can be found on the F1 key. The keyboard is a high-quality design, with a reassuringly firm frame and professional slick action. Toshiba's chosen Synaptics trackpad is better than budget too, a large and buttonless design.

The use of a hybrid disk drive and up-to-date Intel processor means the P50T feels reasonably fluent in use. Geekbench 3 scored the system with 5460 points using all processor cores, and 2766 points single-core. The PCMark 8 Home results were less convincing, just 1797 points, lifted marginally to 2128 points with the help of graphics acceleration.

Although Toshiba quotes a recommended price of £1,099 for the P50T, you can buy this laptop for a shade under £800, making it decent value, as long as you don't need to use it away from mains power for extended periods.

Verdict
The Satellite P50T has high-end touches on a mid-range model, such as UHD IGZO screen and nVidia gaming graphics, plus some metal machining to suggest premium build. It's let down by a reflective screen and lousy battery life. Despite underwhelming benchmark results, it should be speedy enough for general duties. ⊠ **Andrew Harrison**

TABLET/LAPTOP HYBRID
Acer Aspire Switch 11 V SW5-173

Specifications

11.6in (1920x1080, 190ppi) IPS gloss touchscreen; Windows 10 Home; 800MHz Intel Core M-5Y10c (2GHz Turbo) 2C, 4T; Intel HD Graphics 5300; 4GB DDR3 RAM; 128GB M.2 SATA Revision 3.0 SSD; 802.11ac dual-band; Bluetooth 4.0; 1x Micro-USB 2.0 (tablet) 1x USB 3.0 (keyboard); Micro HDMI; microSDXC card slot; stereo speakers; 0.9Mp front camera, 2.1Mp rear camera; single mic; 3.5mm headset jack; detachable UK tiled keyboard and buttonless trackpad; 35Wh lithium-ion polymer battery, non-removable; 45 W mains charger with IEC C5 inlet; 298x205x23.8mm (9.3mm tablet); 1.57kg (761g tablet and 808g keyboard)

Build: ★★★★☆
Features: ★★★½☆
Performance: ★★½☆☆
Value: ★★★☆☆

★★★☆☆

Following Microsoft's blueprint, Acer has been loyally building convertible tablet/laptop hybrids for Windows 8, when the operating system's developer became hell-bent on making Windows touchable in a post-iDevice world. The Aspire Switch 11 V is a subtly upgraded version of 2014's model, now headlining with Windows 10, an improved screen, and 800MHz Intel Core M processor in place of 1.5GHz Core i3.

In essence, the Switch is an 11.6in Windows tablet with a custom keyboard that snatches into place with magnets. Once docked, you get the benefit of real keys and a buttonless trackpad, which interact with the tablet through shiny contacts rather than Bluetooth. Like Microsoft's Surface Pro 4 (page 24), the hinged screen becomes continuously movable to adjust rake; but similarly to the previous release, the ensemble is far too back-heavy.

There's no extra battery in the keyboard, which is a shame as battery life still falls short – just four hours 45 minutes in our streaming video test, where an iPad goes twice the distance. It's doubly disappointing when 2014's Switch 11 ran almost as long with a real Core i3 chip. The Core M is

Intel's ultra-low-power processor, but clearly this setup isn't as efficient as it could be.

On some variants you can get additional storage in the keyboard, if only a whirring mechanical disk, but it's useful to complement the tablet's M.2 flash drive.

As a tablet, the Acer weighs around 760g – or approaching twice the weight of an admittedly smaller iPad Air 2 – and this mass can swell to a portly 1.6kg combined with keyboard. At 24mm thick, the Acer is too outsized for the ultrabook club.

Tablet I/O includes microSDXC slot, Micro HDMI and USB 2.0. Charging is through a separate DC inlet, using an unsightly cable with a spindly plug halfway up the laptop screen.

The Core M processor means fanless operation, but only by aggressively throttling it back to keep it cool. PCMark 8 Home gave the Acer just 1916 points, where sub-2000 scores frequently equate to 'annoyingly slow' real-world performance. Windows 10 at least felt reasonably swift thanks to responsive flash storage.

Unlike an iPad, or even an Asus Zenbook running the same Core M chip with HD Graphics

5300, action gaming is out. We found the Switch 11 V averaged just 23fps in Tomb Raider at 720p and the lowest possible detail.

Compared to the iPad Air 2, Geekbench showed the Acer's processor and memory were faster single-core mode (2208 against 1815 points), but 14 percent slower multi-core (3975 against 4515).

Following Apple, Acer has eliminated the air gap under the top glass that makes shiny screens less comfortable to view, with a full-HD IPS panel of some merit. Colour gamut was only 74 percent sRGB, though it had good contrast (740:1) and wide viewability. Judged by eye, it's a sharp and vibrant screen.

Verdict

At first glance, a two-in-one seems smart except evidence suggests few people want or need Windows tablets. Acer has also failed to address criticisms of 2014's Switch 11 in this new model. This leaves us an underpowered, ill-balanced and clunky little laptop, with mediocre battery life and a nice screen. A better Windows laptop is the £650 Zenbook UX305, but if you need a tablet, buy an iPad Air 2 for £399. ⊠ **Andrew Harrison**

Specifications
5.7in (2560x1440) Quad HD capacitive touchscreen; Android Marshmallow 6.0; Qualcomm Snapdragon 810 v2.1 octa-core processor at 2GHz; 32/64/128GB storage; 3GB RAM; 12.3Mp main camera, dual-LED flash, support for 4K video at 30fps; 8Mp secondary camera; 802.11ac dual-band Wi-Fi with 2x2 MIMO; Bluetooth 4.2; GPS; NFC; 77.8x159.3x7.3mm; 178g

Build:	★★★★½
Features:	★★★★½
Performance:	★★★★☆
Value:	★★★★½

★★★★½

SMARTPHONE

Google Nexus 6P

When Google launched the Nexus 6, it wasn't the upgrade that Nexus 5 owners had been looking for. The 5.96in screen made the Motorola-built phone too big and heavy. In 2015, Google has decided to adopt Apple's strategy and launch two phones, with the aim of appealing to a wider audience. There's the 5X (page 37), the true successor to the Nexus 5, and the 6P, which we look at here, with a 5.7in screen.

Design

The 6P is the first all-metal Nexus flagship smartphone. It's made of CNC-machined aeronautical-grade aluminium, which Google says is "really nice". And it is. It's slim and sleek for a big phone, and looks very much the part.

It feels lighter than you expect, too – it's similar in size to the iPhone 6s Plus, but weighs around 20g less. Recently, videos have been posted showing how 'easy' it is to break the Nexus 6P in half. It may not be the strongest phone out there, but as long as you don't grab it with both hands and try to snap it in half, then it's probably going to be fine. More worrying is the small number of reports of the glass panel covering the rear camera spontaneously cracking or shattering.

Aside from this controversy, the phone looks better in the flesh than in pictures. Although the black strip of gorilla glass looks ugly, it's not that bad when you see it for real, and the very slight bulge helps you work out which way is up by touch alone. If we're being really critical, we don't like the plastic panel that sits at the bottom of the rear side. It doesn't match the aluminium in colour but – as with the top strip – hides antennas. The huge CE markings (not shown in the photos here of an early sample 6P) seem a bit unnecessary, though.

Compared to the Nexus 6, the 6P is much more manageable to hold with one hand. It's thinner by 3mm and the bigger screen-to-body ratio makes all the difference. While it's not going to slip easily into a pocket (especially in a case) it's going to be a lot easier to live with.

Around the back – just as you'll find with other Huawei phones such as the Mate S – is a fingerprint scanner, called Nexus Imprint. This will come in handy for Google Pay and – eventually – third-party apps, although there's still no confirmed launch date for Android Pay in the UK. You can register five fingers and there's no need to wake the phone before using it.

Your index finger almost falls naturally on to the sensor when you pick up the phone – it's something we quickly adjusted to. Like the iPhone 6s, the scanner is very fast, recognising your print almost instantaneously, and waking and unlocking the phone.

At the front are stereo speakers and there are three mics – two on the front and one on the rear. Compared to phones with speakers at the back or on the bottom edge, the sound quality is excellent and there's plenty of volume.

To add to the disappointment of non-expandable storage, there's an irremovable 3450mAh battery. Google says the support for fast charging gives you up to seven hours of use from only 10 minutes of charging. However, you'll need to use the included charger. When we hooked up to our in-wall USB charging plate, we saw the battery go from 7- to 28 percent in 30 minutes. That's no quicker than an iPhone 6s Plus charges.
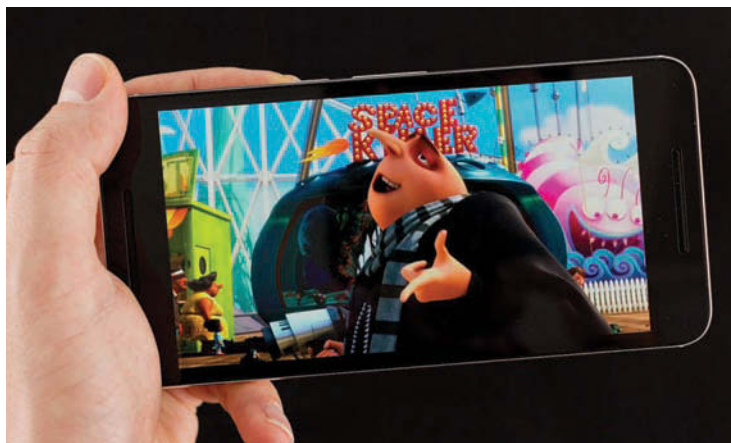
But with the official charger, the phone charges from 15- to 30 percent in a little over 10 minutes and 15- to 90 percent in just over 30 minutes. Fast charging is most effective when the battery is very depleted, though.

Display

If you like big screens, you will love the 6P's 5.7in AMOLED display that's protected by Gorilla Glass 4, which is fitted flush into the aluminium frame. The resolution – as you'd expect of a premium Android flagship – is a quad-HD (2560x1440). It's by no means the first to have this resolution, but it looks gorgeous, with eye-popping colours and detail. Viewing angles, of course, are very wide and contrast is fabulous.

The high resolution also helps when taking photos and videos as its much easier to see when things are in focus (or blurry). Look as close as you like: you can't see the individual pixels that make up the screen.

The screen looks good at any screen brightness including when dim – something other AMOLED phones fail at. The tech also offers battery-saving potential. When you pick up the 6P, notifications are shown in mono and only the necessary pixels are lit up. Off-centre it's possible to notice

Geekbench 3

Nexus 6P	4211
iPhone 6S Plus	4407
Galaxy S6	4438
Xperia Z5	4212
Nexus 5X	3528
Nexus 6	3304
Galaxy Note 5	5149

0 500 1,000 1,500 2,000 2,500 3,000 3,500 4,000 4,500 5,000

a rainbow effect – like an oil slick that covers the screen – but for the majority of time you won't see it.

Hardware

The 6P is powered by a Snapdragon 810 v2.1 octa-core processor (as also used in the OnePlus 2). It has Adreno 430 graphics and is backed by 3GB of RAM. As you can see in our graphs (right), it's not the quickest by any means. In use, it's more than fast enough but we were frustrated by the odd moment of hesitation when using certain apps or changing certain settings.

A handy feature is being able to double-press the power button to launch the camera app, which starts quickly and means you can take a photo almost as soon as the phone is out of your pocket. Thoughtfully, the button has a rough texture, so your finger can differentiate it from the volume rocker below.

The battery will last a day with general use. It's the same story as for other flagships: use it lightly and you'll get a day and a half, but hammer it (with games and shooting 4K video) and you will be reaching for the USB-C cable at dinner time.

But Android Marshmallow brings new power features to the table: App standby and Doze. The former closes down apps that haven't been used, which helps a little, but Doze is superb. When your phone is in standby and not moving, it kicks in automatically and shuts down whatever it can. You don't need to enable it as it's part of the operating system. Only high-priority alerts will get through, such as text messages. Others, like a reply to a Facebook post, won't.
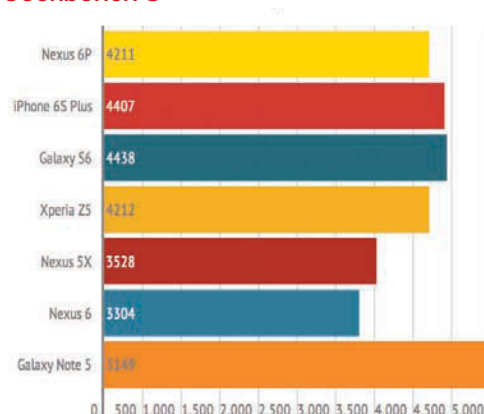
What it means is that your 6P's battery won't drain overnight if you forget to put it on charge: our sample went down only a couple of percent in nine hours.

In terms of connectivity, there's dual-band 2x2 MIMO 802.11ac, Bluetooth 4.2, NFC, GPS and LTE. And along with the fingerprint sensor, there's an accelerometer, gyroscope, barometer, proximity sensor, ambient light sensor and hall sensor.
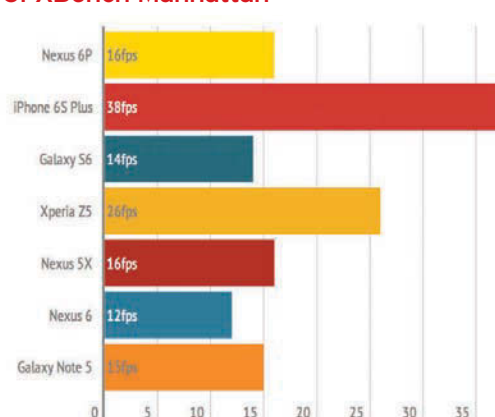
Cameras

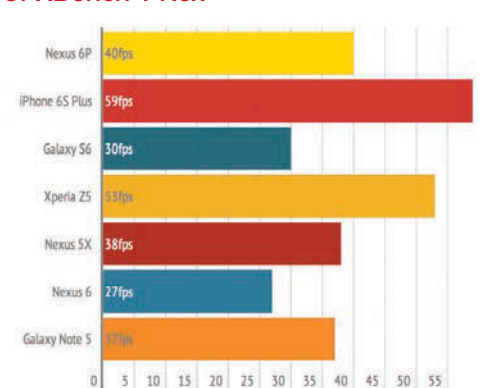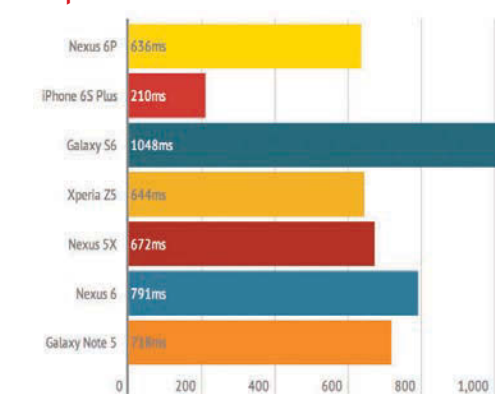In previous Nexuses, the camera has been a bit of a sore point. LG, Motorola and others haven't

GFXBench Manhattan

Nexus 6P	16fps
iPhone 6S Plus	38fps
Galaxy S6	14fps
Xperia Z5	26fps
Nexus 5X	16fps
Nexus 6	12fps
Galaxy Note 5	15fps

0 5 10 15 20 25 30 35

GFXBench T-Rex

Nexus 6P	40fps
iPhone 6S Plus	59fps
Galaxy S6	30fps
Xperia Z5	53fps
Nexus 5X	38fps
Nexus 6	27fps
Galaxy Note 5	37fps

0 5 10 15 20 25 30 35 40 45 50 55

SunSpider*

Nexus 6P	636ms
iPhone 6S Plus	210ms
Galaxy S6	1048ms
Xperia Z5	644ms
Nexus 5X	672ms
Nexus 6	791ms
Galaxy Note 5	718ms

0 200 400 600 800 1,000

* lower is better

100 percent crop of righthand image

managed to put in a camera worthy of the 'premium' tag. However, the 12.3Mp Sony sensor in the 6P changes all that.

It may not have the highest resolution, but anyone that knows anything about cameras will know that larger pixels - bigger receptors – capture more light and therefore more accurately capture colours. It's not always true, but this is most certainly the best camera on any Nexus phone.

The pixels are 1.55 microns in size – compared to 1.22 in the iPhone 6s Plus, for example. (The 6 Plus had 1.55-micron pixels, but was only 8Mp.) This help indoor photography in particular, where there's much less light.

You also get slo-mo video, at 240fps in 720p, and you can select the section of video to slow down in the Google Photos app. A burst mode shoots at 30fps and you can then choose your favourite later from a selection of eight. The phone can also make an animated GIF from these, which is highly shareable unlike Apple's new Live Photos.

In our tests, the main camera performed admirably. For the most part the laser autofocus did its thing, working quickly and accurately. There were still around 10 percent of blurry shots, some of which shouldn't have been as nothing was moving in the frame.

But the other 90 percent were largely spectacular. Images are processed – obviously – and the sharpening and saturation may be overdone for some tasted, but we loved it. Flowers, foliage, grass, fur: everything is sharp and detailed.

Macro shots are great too, and the ability to tap the screen to set a focus point, then use the volume buttons to take the shot instead of stabbing the onscreen button and wobbling the camera is great.

In low light, the 6P does a great job of retaining detail, albeit seemingly at the expense of colour noise. In the photos below, it's clear the 6P's image is too saturated compared to the iPhone 6s Plus. But the 6s Plus' effort lacks detail - the smudging effect is likely a result of the noise reduction system.

The Nexus 6P's videos are excellent, too. 4K footage has the expected detail, along with vibrant colours. The speedo icon in the native camera app makes it easy to flip between 30-, 120- and 240fps (changing resolution as you go) but there's no support for 1080p/60. We hope this is added in an update.

But the camera app is well designed and sensibly defaults to the highest resolution for photos on both front- and rear cameras. There's also tight integration with Google Photos, which is both a great app and a great service. For example, you can turn off 'creations' in the c bust mode settings.

The app also supports HDR, panoramas and photo spheres (the latter of which stitches photos so you can explore the full 360 degrees of a scene).

Let's not forget the front camera in all of this. The 8Mp sensor is also capable of great photos: sharp and with lots of detail. It's ideal for selfies and has a wide-enough field of view to get two people in the shot at arm's length. It will also record 1080p video at 30fps. Panoramas (or wide selfies) aren't currently supported in the app, though.

Software

Out of the box, the 6P has Marshmallow – Android 6.0. It comes with several new features. Now on Tap allows you to get context-sensitive information 'cards' by holding the home button. That might not sound all that different from Google Now in Lollipop, but the difference is that it will work within apps, offering information relevant to that app. In many other ways, Marshmallow looks very similar to Lollipop, with minor tweaks here and there. The are individual volume sliders for media, notifications and alarms, for example.

Verdict

Originally, Nexus phones stood out for being excellent value at a low price. They weren't an alternative to flagship handsets, but they had the advantage of running stock Android and getting the next version more quickly. The 6P, though, is not only a flagship, but is arguably the best Android phone on the market. It won't suit everyone due to its size, nor those looking for a phone with dual-SIM slots or a removable battery. But the excellent screen, front-firing speakers, quick charging, great cameras, speedy performance and Android Marshmallow add up to make this a phone that's a pleasure to use. And yes, it's also cheaper than its rivals. ☒ **Jim Martin**

Specifications
5.2in Full HD screen; Android 6.0 Marshmallow; Qualcomm Snapdragon 808, six-core processor; 2GB RAM; 16/32GB storage; 12.3Mp rear camera with dual-tone LED; 5Mp front camera; Fingerprint scanner; NFC; 11ac Wi-Fi; Bluetooth 4.2; 2700mAh battery; 7.9mm; 147x72.6x7.9mm; 136g

Build:	★★★★☆
Features:	★★★★☆
Performance:	★★★★☆
Value:	★★★★☆

★★★★☆

SMARTPHONE

Goggle Nexus 5X

One of two new Google phones, the Nexus 5X is the smaller brother to the 6P, (page 34) and one of the first to run Android 6.0 Marshmallow. It has quite a few upgrades compared to the Nexus 5, which arrived way back in 2013, and is also built by LG as Google's manufacturing partner. And as the LG G4 is now cheaper, it's one of the 5X's rivals.

In fact, this Nexus has lots of rivals, including the Moto X Play, and the cheaper OnePlus 2. It's a great phone overall, with one of the best 1080p screens we've seen, along with one of the best cameras. But it's not all great news. This isn't just a 6P with a smaller screen, sadly. The 5X also has a slower processor, which means it lacks some of the shooting modes you get on the 6P and – for some reason – Google thinks people won't want any more than 32GB of storage. And the base 16GB model really doesn't have enough usable storage for a phone that records 4K video which uses up 300MB per minute.

But instead of dwelling on the negatives, let's get into the detail as there's lots to like about the 5X.

Design
Despite an increase in screen size from 5- to 5.2in, the Nexus 5X is still nice and light. It weighs a comfortable 136g, and is 7.9mm thick. It is larger than the 5, though, so anyone hoping for a bigger screen in a phone the same size will be disappointed. Here's how they compare:

Nexus 5: 138x69x8.6mm, 130g
Nexus 5X: 147x73x7.9mm, 136g

Rounded edges on the rear panel make the 5X a nice phone to hold in the hand and we like the matt finish plastic, which is similar to the original. There's a choice of colours including Black, White and Ice Blue, although this applies only to the back: they're all black on the sides and front.

There's not a lot else to say on the design front as the device, like the Nexus 5, is plain. That's a good thing, although features such as waterproofing wouldn't go amiss. One thing to note: despite appearances, the 5X does not have stereo speakers. The top grille hides a speaker that's used for phone calls, with only the bottom one being a loudspeaker.

Another thing to point out is that the camera does stick out a little bit at the back. It's now positioned centrally and although the Nexus 5's camera wasn't flush the 5X's protrudes much more.

If you're wondering about the circle below the camera, it's a fingerprint scanner (see above), which we'll talk in more depth below.

The Nexus 5X takes a nano-SIM rather than micro, which may require a new SIM card if upgrading from the Nexus 5.

Hardware
Given that the Nexus 5 launched two years ago, it's no surprise that the 5X is upgraded in almost every area. But don't expect it to blow its predecessor out of the water because the top-end hardware has been reserved for the 6P.

Google has decided to stick with a Full HD screen resolution on the Nexus 5X. This, of course, means a small drop in pixel density to 424ppi. It's not noticeable, of course, and the screen is still crisp with pixels that are invisible to virtually all human eyes. But if you want an upgrade to Quad HD, you'll have to look at the Nexus 6P – or elsewhere. The LG G4 is around £399 – £60 more than the 5X.

Staying with the display, the 5X has an IPS LCD panel just like the Nexus 5, but unlike the 6P, which uses AMOLED. However, this is no criticism. The 5X has one of the best screens we've seen on a smartphone. Although the colours don't assault your eyeballs as they do on the 6P, they're accurate and the screen is bright with excellent contrast.

There's an uprated Qualcomm processor too. The Snapdragon 808, as used in the flagship LG G4, is a nice upgrade from the 800 model which was top-of-the-line when the Nexus 5 arrived.

This means the Nexus 5X has a six-core processor with four A53 cores at 1.4GHz and two A57 cores at 1.8GHz. There's also Adreno 418 graphics which performed well in our tests – better than the Nexus 6P's Adreno 430 in fact. (This is due

The 5X has one of the best screens we've seen on a smartphone. The colours are accurate, while the screen is bright with excellent contrast

to the fact the 6P has more pixels – it's more powerful if you run the benchmarks at 1920x1080.)

Despite rumours suggesting the 5X would have 4GB of RAM, the allocation remains at 2GB. And storage options are more limited than the 6P. The 5X doesn't offer 64- or 128GB as the 6P does, instead there are merely 16- and 32GB options. And as usual with Nexus phones, there's no microSD card slot, so you'll probably want to go for 32GB, which costs £379.

One of several features shared between the two new phones is the fingerprint scanner: Nexus Imprint. It's positioned below the camera at the rear of the phone. It might seem a little strange, but it's where your index finger naturally lies.

It's also incredibly fast and unlocks the phone almost instantly. The system learns your fingerprint and recognition improves over time. As well as offering easy access to the phone, other apps can use the sensor for logging in or making payments. Plus, of course, Android Pay will be coming to the UK at some point, so you'll be able to pay with your phone in bricks and mortar stores as you can with an iPhone.

The next shared feature is a new physical port in the form of USB-C which is fast becoming the standard for new Android phones: it can also be found on the OnePlus 2 and the Xiaomi Mi4C (which, incidentally has very similar specs to the 5X for half the price).

USB-C's main feature is that it's reversible, but it also enables fast charging and you can even charge other devices from the 5X should you wish to.

The larger frame means a larger battery at 2700mAh, but it's a big shame there's no wireless charging: that's a step backwards from the Nexus 5 and a blow for many looking to the 5X as the definitive upgrade.

Elsewhere there's dual-band 11ac Wi-Fi, LTE (both faster than before), NFC and Bluetooth 4.2, but no infrared port or extras such as a heart rate monitor.

Cameras

The last of the shared upgrades between the 5X and 6P are the cameras. Arguably, this is the biggest upgrade for the 5X. The Nexus 5's 8Mp camera wasn't amazing, even with the software updates that improved things following its launch. But amazing is an adjective that will be used
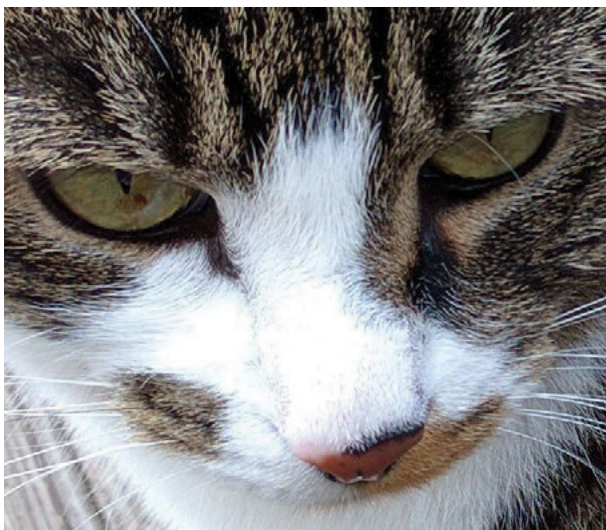
repeatedly for the 5X's main camera. It's one of the best cameras on any phone and as far as we can tell is identical to the unit on the 6P.

At 12.3Mp, the new camera is not only higher resolution, but has a dual-tone LED flash, an IR laser focusing system and can shoot 4K video. There are phones with more megapixels, but the larger size of the sensor and pixels means more light hits them. The improvement in quality is obvious from the photos, but it performs well not only in good light: it's also pretty good in dim conditions too.

In photos and videos colours are rich and detail is sharp. As we said in our review of the 6P, there's possibly a little too much sharpening going on. But most people will be over the moon with this level of quality from a £339 phone.

It's worth noting that you need to use the HDR+ mode most of the time to get the best quality, and this does introduce a second or so delay

100 percent crop of righthand image

Geekbench 3

Nexus 5X	3528	
OnePlus 2	4094	
Nexus 6P	4211	
Nexus 5	2800	
LG G4	3513	
Moto X Play	2570	

GFXBench Manhattan

Nexus 5X	16fps	
OnePlus 2	16fps	
Nexus 6P	14fps	
Nexus 5	9fps	
LG G4	9fps	
Moto X Play	6fps	

GFXBench T-Rex

Nexus 5X	38fps	
OnePlus 2	46fps	
Nexus 6P	34fps	
Nexus 5	24fps	
LG G4	25fps	
Moto X Play	15fps	

SunSpider*

Nexus 5X	672ms	
OnePlus 2	1471ms	
Nexus 6P	636ms	
Nexus 5	801ms	
LG G4	715ms	
Moto X Play	1235ms	

* lower is better

of processing between images. You can shoot without it, but skies tend to blow out even when the contrast to the foreground doesn't appear that high.

The other gripe is the absence of a 60fps 1080p mode: you can shoot video only at 30fps in 4K or 1080p. That's something which could be fixed with a software update.

Features

What won't be added is a 240fps slo-mo option, nor SmartBurst. Both are features you get with the 6P. The Snapdragon 808 isn't quick enough to handle the way Google has implemented these features, so you're limited to 120fps at 720p. It's a shame, but won't be a dealbreaker for everyone.

More of a disappointment is that the 5X doesn't even have electronic image stabilisation, let alone optical. That means both new Nexus' lack OIS and you'll need steady hands if you want shake-free video and blur-free low-light photos from your 5X.

At the front is a nice upgrade to a 5Mp selfie camera. Again, it's the same as the 6P's which means decent quality photos.

Performance

We already know that the Snapdragon 808 isn't as quick as the 810 in the 6P, and that it has only 2GB of RAM versus the 6P's 3GB (and it's a similar story with the OnePlus 2, which at £289 is much cheaper than both Nexus phones). The graphs (right) show the difference in our benchmarks, but again, it's important to note that the lower screen resolution explains why the 5X's framerates are higher in GFXBench. In general use, the 5X feels very quick whether you're playing games, switching between apps, browsing the web or just navigating around Marshmallow.

The battery life is very good, too, lasting a shade under seven hours in our tests. The new battery saving features in Marshmallow will also help if you need to eke out several hours when power is running low.

And there's support for fast charging using the included charger, giving up to seven hours of use from 10 minutes' charging – according to Google. But it's not Qualcomm Quick Charge 2.0 or 3.0. Like the 6P, it seems to be a proprietary system, so you'll need the official charger or a third-party USB-C charger that can output 5V/3A.

Software

Out of the box the phone runs Android 6.0 Marshmallow. It's similar to Lollipop but isn't exclusive to the 5X or 6P, of course. Existing Nexus devices will be upgraded shortly, including the Nexus 5.

The benefit, as with any Nexus phone or tablet, is that you get pure Android as Google intends it to be – no add on skins like Samsung's TouchWiz or HTC's Sense. Not only does it offer something of a blank canvas with which to customise Android to your heart's content, it means you don't have to worry about things like preinstalled apps which you may not be able to delete.
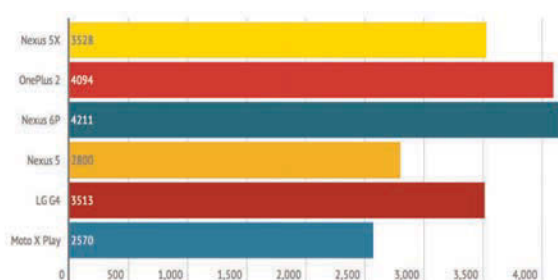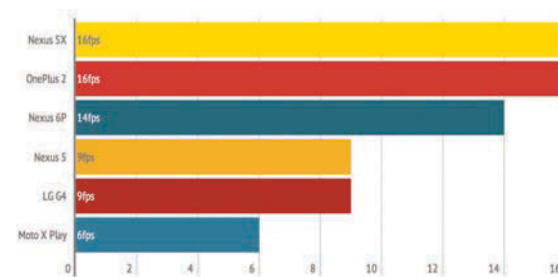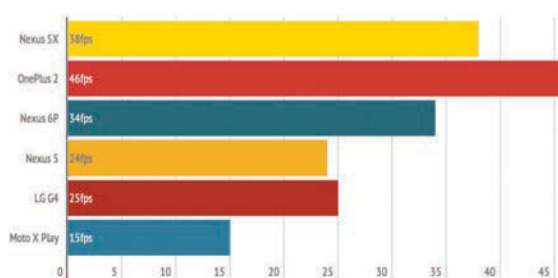
Verdict
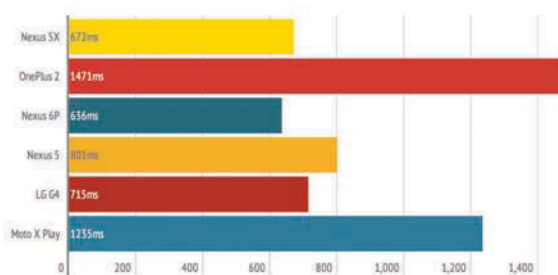
The 5X is a fantastic phone overall, with excellent cameras, a good turn of speed and an excellent screen. But it's noticeably bigger than its predecessor despite the small increase in screen size, it has limited storage compared to the Nexus 6P and it lacks a couple of camera features due to the slower processor. The absence of wireless charging is another blow for some, but additions such as the fingerprint scanner will make it a great upgrade for others. ⊠ **Jim Martin**

Specifications
5in full-HD (1920x1080, 441ppi) AMOLED, Gorilla Glass 3; Oxygen OS based on Android 5.1.1 Lollipop; 2.3GHz Snapdragon 801, quad-core; Adreno 330; 3GB LPDDR3 RAM; 16GB, plus up to 128GB microSD; 13Mp rear camera, f/2.2 aperture, 1080p video/120fps slo-mo at 720p; 8Mp front camera, f/2.4 aperture; gyroscope, proximity, ambient light, hall sensor; 2525mAh non-removable lithium-polymer battery; Micro-USB charging port; 4G bands 3, 7 and 20; dual-Nano-SIM; 2.4GHz 802.11b/g/n Wi-Fi; Bluetooth 4.0; GPS; GLONASS; 3.5mm headphone jack; FM radio; 140x69x6.9mm; 138g (Onyx), 160g (Ceramic)

Build: ★★★★☆
Features: ★★★☆☆
Performance: ★★★★☆
Value: ★★★★☆

★★★★☆

SMARTPHONE
OnePlus X

OnePlus has made a name for itself by offering phones at far lower prices than you would expect if you looked at the spec sheet and images of the device. This tradition continues with the X, which is the firm's cheapest offering to date.

The OnePlus 2 is a steal at just £239, but the X is even more affordable at £199. There is little competition below the £200 mark in the smartphone market, but the OnePlus X does have some rivals. The Motorola Moto G (third generation), for example, which offers pretty decent specs for just £159 as standard, but doesn't offer the same level of design and build.

At this price, you're probably already interested in getting your hands on one, but that's where you may run into a small problem. Like previous One Plus phones, you need an invite to buy one, which is a bit of a spanner in the works.

Third-party vendors sell the X without you requiring an invite, but OnePlus does not support or advocate people buying its products via unofficial third-party vendors.

Design
OnePlus has thought long and hard about the look and feel of the X and has done a sterling job. The metal frame, with its almost nano-sized ridges and dark glass front and back, features a bevelled edge adding both style and comfort.

It reminds us of the gorgeous Sony Ericsson C902 from yesteryear, and there's almost no faulting the OnePlus X in this area. It's thin and light, which is a big improvement on the pretty brick-like OnePlus 2 – just 6.9mm and weighing 138g.

The Alert Slider button on the left side of the phone lets you switch between three different notification profiles. This is handy when you want to quickly make sure your phone stays quiet or doesn't with minimal effort. We say almost because the glass back makes for a slippery experience, whether it be sliding off the arm of your sofa or moving gradually across a flat surface when you're trying to scroll. Something that may solve this is OnePlus' range of cases.

Comparing the X to the Moto G there's no waterproofing here, so it's more about style and we're fine with that.

We took a look at the Onyx black glass model, but there is also a limited edition ceramic version if you happy to pay more and deal with the increased weight of 160g.

Hardware
Treating the this phone as a mini version of the OnePlus 2, there are a number of downgrades and that makes a large amount of sense since the X is a cheaper option.

A major difference is that the screen is smaller and we're pleased that the firm has chosen to offer a device more compact than its others. After all, not everyone wants a heavy 5.5in handset.

The resolution remains at Full HD though, so it's got a higher pixel density. Using AMOLED technology, we're impressed with the display's deep blacks, great viewing angles and the brightness on offer – we've found ourselves using it on the lowest setting quite comfortably.

A 2.3GHz quad-core Qualcomm Snapdragon 801 processor seems to be a cost-cutting measure since the chip is now out of date. Accompanying this is 3GB of RAM and although this combination doesn't make for exciting reading, we've found performance to be smooth. The main thing is that the chip isn't 64-bit.
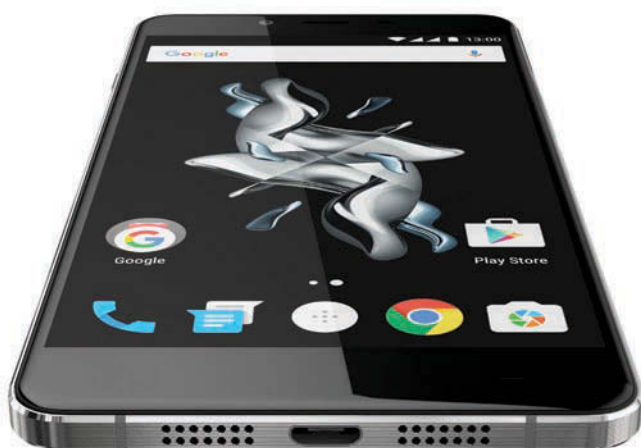
PC ADVISOR
RECOMMENDED

OnePlus has fitted a 2525mAh battery inside the X and we recorded a benchmark result of four hours 57 minutes.

There's just 16GB of internal storage available here – you'll get around 11GB to play with after taking into account the preinstalled software. Thankfully, there is a microSD card slot, so you can add up to 128GB more. It's worth noting that the OnePlus X is dual-SIM and putting a memory card in takes up one of those slots, so you can't have all three in at the same time.

At this price, there have to be cuts somewhere, and unlike the OnePlus 2, the X doesn't have a fingerprint scanner or reversible USB Type-C. It also lacks 11ac Wi-Fi and NFC, which is a shame for anyone wanting to use payment systems or other near field benefits.

The OnePlus X has a 13Mp camera at the rear with an LED flash. This shoots in a 4:3 aspect ratio by default (as does the front camera), which is novel, and the app is simplistic. There's no optical image stabilisation, but there is phase detection autofocus. The results are good (see opposite) but not great and we've seen much better 13Mp cameras. At the front

Geekbench 3

OnePlus X	2524
OnePlus 2	4094
Moto G	1628

0 500 1,000 1,500 2,000 2,500 3,000 3,500 4,000

GFXBench Manhattan

OnePlus X	10fps
OnePlus 2	16fps
Moto G	4fps

0 2 4 6 8 10 12 14 16

GFXBench T-Rex

OnePlus X	23fps
OnePlus 2	46fps
Moto G	10fps

0 5 10 15 20 25 30 35 40 45

SunSpider*

OnePlus X	1329ms
OnePlus 2	1471ms
Moto G	1344ms

0 200 400 600 800 1,000 1,200 1,400

* lower is better

is an 8Mp snapper, which is good but not as detailed and sharp as we normally find at this resolution.

Software

The software is another strong point for the OnePlus X as the phone is running the firm's own Oxygen operating system, which is based on Android 5.1 Lollipop. We would have preferred the latest 6.0 Marshmallow but it's not the end of the world, partly because OnePlus has added similar features.

Although it might sound like a heavily modified user experience, this isn't the case. Oxygen OS has very much a stock Android look and feel. This means you get pretty much all the same elements as a Nexus device, including the notification bar and recent apps.

Motorola offers a slightly more stock experience with Google Now a swipe away from the homescreen. Oxygen OS instead has Shelf, a method of accessing your most used apps and contacts. Another bonus is the lack of bloatware, so you get Google's range of apps and not much more, giving you a nice blank canvas to get started with.

You can choose onscreen navigation buttons, the usual Android ones, but it's probably worth opting against this during setup. The X has touch-sensitive buttons below the screen, which can be utilised, even if they are hard to see with no backlight. Each one can also be assigned a long press- and double-tap action which is great.

We mentioned that you get Marshmallow features with the OnePlus X, so you can adjust individual app permissions and you can rearrange the quick settings tiles. You also get nifty features such as gestures (double-tap to wake the screen, draw an O to open the camera, and so on) and customisation including the accent colour of the interface and the LED notification light.

Verdict

The OnePlus X is the best value smartphone of the year. We love the premium design in a smaller form factor to the firm's other phones. Software is a strong point and you get a gorgeous screen. However, cuts had to be made somewhere and the X is lacking features such as NFC, Wi-Fi and 11ac. It is also missing the fingerprint scanner and USB Type-C port found on the OnePlus 2. Battery life isn't great and cameras aren't best in class but this is a great phone for the price. ⊠ **Chris Martin**
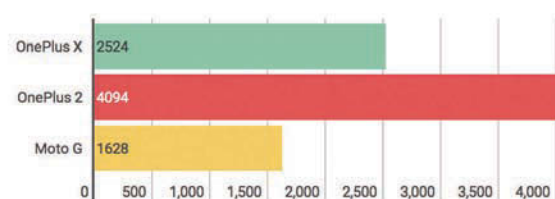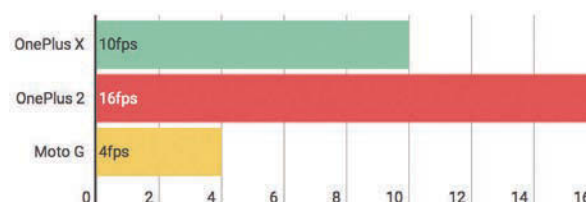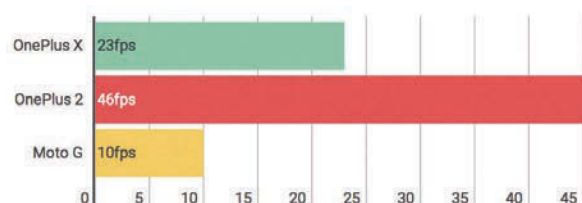
Specifications
5in full-HD (1920x1080, 441ppi) IPS touchscreen with Sunlight display; MIUI 7 (based on Android 5.1 Lollipop); 1.8GHz Snapdragon 808 64-bit hexa-core processor; Adreno 418 graphics; Edge tap; 16GB of storage and 2GB of LPDDR3 RAM or 32GB of storage and 3GB of LPDDR3 RAM; dual-SIM dual-standby (both 4G Micro-SIM, but no support for 800MHz 4G); dual-band 802.11ac Wi-Fi; Bluetooth 4.1; GPS; OTG; IR blaster; 13Mp Sony IMX258 camera with two-tone flash, phase-detection autofocus and 0.1s autofocus; 5Mp front camera; 3080mAh battery; USB-C with Quick Charge support; 138.1x69.6x7.8mm; 132g

Build:	★★★☆☆
Features:	★★★⯪☆
Performance:	★★★☆☆
Value:	★★★★☆

★★★⯪☆

SMARTPHONE

Xiaomi Mi 4C

The Xiaomi Mi 4C looks on paper (and in the flesh) to be a fantastic device, half the price of the similarly specified Nexus 5X (page 37) with performance that can be just as fast. But 'can be' is the key point here, as overheating issues plagued our review sample.

Xiaomi doesn't officially sell its phones in the UK, so if you want to get hold of one you'll need to buy it from a Chinese website that will ship to the UK. However, be warned that if you are shipping this phone to the UK from China you may also have to pay import duty.

Design

For a £150 phone made of plastic (albeit with a metal inner frame for enhanced rigidity and durability), the Mi 4C is good-looking. A thin slab just 7.8mm thick, it has a soft-touch coating that feels great in the hand. There's no creaking or flexing – this phone feels very well made.

The screen-to-body ratio is high, with some pretty slim bezels. For a phone that has a 5in screen, the Mi 4C is extremely well proportioned, just 138.1x69.9mm. It's also lightweight, at 132g.

Available in black, white, pink, blue or yellow the Mi 4C can be elegant or fun in its appearance.

You'll find buttons and connectors in all the usual places, with a metal-effect volume rocker and power button high up on the right edge, a 3.5mm headphone jack and IR blaster at the top, a dual-SIM tray that pops out from the left edge and a USB-C port on the bottom. Turn over the phone and there's a 13Mp camera with two-tone flash in the upper left corner, and a speaker grille that is slightly raised off the surface of a desk by a small plastic protrusion to help prevent the sound being muffled.

The screen is a plus point, with a 5in full-HD (1920x1080 pixels) IPS panel with a sharp pixel density of 441ppi. Contrast is excellent, though the screen could be brighter.

Hardware

The Xiaomi Mi 4C has the same core hardware as the Nexus 5X, with a 1.8GHz hexa-core Qualcomm Snapdragon 808 64-bit chip, Adreno 418 graphics and 2GB of LPDDR3

RAM (3GB in the 32GB Advanced model). Both feature full-HD IPS screens, although the Nexus' is slightly larger at 5.2in against the Xiaomi's 5in. On paper, performance should be very closely matched.

We found performance to be very good and to be right up there with the Nexus 5X. In Geekbench 3, for example, we measured 1251 points in the single-core component and 3233 in multi-core. By comparison, the Nexus 5X scored 1240 single-core and 3528 multi-core. But each time we ran Geekbench 3, the Mi 4C began to heat up and our results very quickly fell off a cliff – to the extent that we were unable to get higher than 650 points single-core and 2027 multi-core.

We also ran AnTuTu on the Xiaomi Mi 4C from cold and recorded a very good 54,250 score. When the phone began getting warm this dropped to 44,818 points.

We saw the same results in every benchmark we ran. In SunSpider (using Google Chrome) we recorded 496ms cold, which is incredibly good, but 1369ms warm (lower is better in this test). The Nexus 5X averaged 672ms.

We also ran the intensive GFXBench graphics test. The 5X completed this test with results of 16fps in Manhattan and 38fps in T-Rex. Despite housing the same processor and graphics chip, the Xiaomi Mi 4C could handle only 15fps in Manhattan and 34fps in T-Rex. As it became warm, this dropped to 11fps in Manhattan and 23fps in T-Rex.

These aren't small differences we're talking about here. It's

important to point out that the Xiaomi Mi 4C feels fast and responsive in real-world use, but our benchmark results show how performance can rapidly deteriorate as you use the phone.

It's not all doom and gloom when it comes to performance, though. Despite its dinky shell the Xiaomi Mi 4C is fitted with a generous 3080mAh battery that supports Quick Charge over USB-C (and is supplied with a compatible charger). It may not be removable, but you should get two days of use out of this Android phone.

Connectivity

The Mi 4C can accept two Micro-SIM cards. It's a dual-standby model, although both SIM slots can support 4G. Unlike some other Chinese dual-SIM phones we've seen, you cannot use the second SIM slot to insert a microSD card.

When buying a phone from abroad you should always check the frequency bands it offers to ensure that it will be compatible for your home network. The Xiaomi Mi 4C does not support the 800MHz LTE band, which means O2 customers (and customers of operators that use O2's network, such as GiffGaff) will not be able to use 4G data. The 1800MHz and 2600MHz 4G LTE bands are both covered.

A standout feature here is the IR blaster. The Mi 4C also supports 802.11ac Wi-Fi, Bluetooth 4.1, GPS and GLONASS, OTG and Miracast. NFC is not supported, and neither is there a fingerprint scanner, but there is a reversible USB-C data transfer and charging port.

Cameras

The Xiaomi Mi 4C is fitted with a 13Mp Sony IMX 258 camera with phase-detection autofocus and a two-tone flash at the rear, and a 5Mp front camera. You can switch between the two with a swipe up or down on the screen.

The selfie camera on the whole works well. However, we noticed in our testing it will try to work out how old you look in the shot. And it had some difficulty in deciding whether it was looking at a 25-year-old female or a 50-year-old male.

Real-time filter previews are accessible with a swipe in from the right side of the screen. Swipe in from the left to access all the usual shooting modes including HDR, Panorama, Fish eye, Tilt-shift and Beautify. In Manual mode, you can control the white balance, focus, exposure time and ISO. Video recording tops out at 1080p.

Our test shots from the Xiaomi Mi 4C were reasonably good, full of detail and with great colours. HDR improves things, and we'd recommend leaving it on.

Software

The Xiaomi Mi 4C runs the MIUI 7 operating system, which is based on Android 5.1 Lollipop. Out of the box, we had an awful first impression. Before the phone was shipped to us an unofficial version of MIUI 7 had been preinstalled (with the version number 77.00.44.00). We expect this is because out of the box Xiaomi phones don't run Google apps, including the Google Play store.

Unfortunately, it's nothing like proper MIUI 7, and is plagued with third-party apps that pop up when you don't need them to and all manner of adverts. The good news is its really easy to install the official version of MIUI 7 and then sideload Google apps. Here's how:

1. Go to tinyurl.com/nmqsmn9 and download the latest stable ROM to your PC or Mac.
2. Plug the Mi 4C into a computer using the USB-C cable. Open a file manager window to browse its contents and drop the downloaded file on to its internal storage.
3. Open the Settings menu on your phone and scroll down to About phone. At the bottom of the screen you'll see a System updates option; tap this.
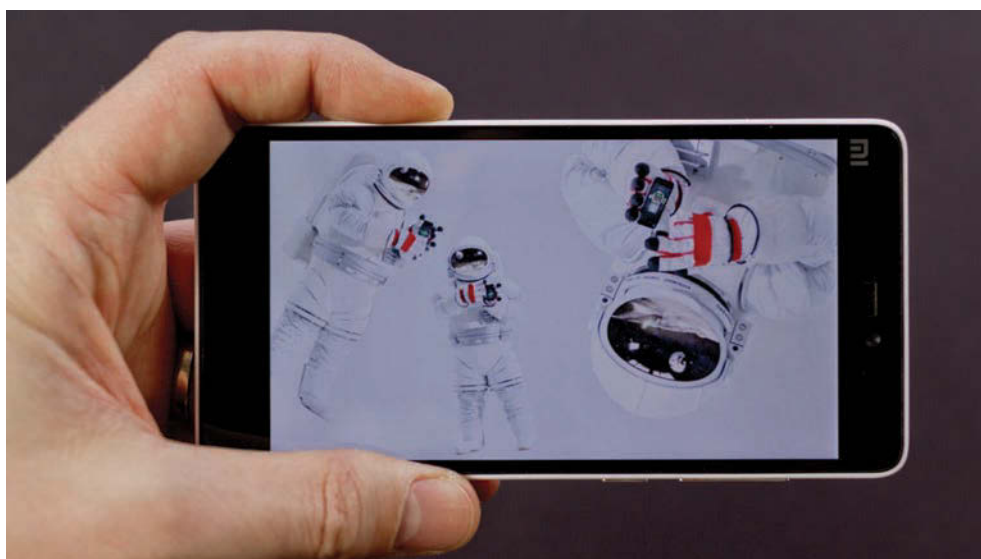
4. Tap the three dots at the top right of the screen and select 'Choose update package'. Browse to the downloaded file on your phone and follow the instructions to install it.
5. When our phone rebooted some of the features that had previously been preinstalled were still present, so we performed a factory reset (Settings, Additional Settings, Backup and reset, Factory data reset, enable Erase stored content, Reset phone). This will wipe the Google apps from the phone, but it's easy to get them back.
6. Back on your PC or Mac download the Google Installer apk from tinyurl.com/py6bfnr.
7. As before, plug the Mi 4C into your computer, open a file browser and drop the downloaded file into the Downloads folder.
8. On the phone you should now open the File Explorer app (which is in the Tools folder on the home screen). You should see the downloaded apk file at the top of your recent activity, or you can look within the Downloads folder. Tap on the download. It's a third-party app, so MIUI 7 will warn you about installing such things – wait for it to count down from 10 and you can then click 'Allow once'.
9. Once installed you'll see a list of Google apps you can install, including the Play Store. You will likely find it will prompt you to download and install the Google Services Framework before you can install the Play Store, so accept this installation when prompted.
10. Following our installation of the Play Store we found some apps within the store were reported as not being compatible with our device. However, it's easy to search online for their apk file and then install it to the Mi 4C in exactly the same way you just installed the Google Installer apk.

Having set up our Mi 4C with MIUI 7 as it was intended, our experience with the phone was infinitely better, and we did begin to see what the fuss is all about with Xiaomi phones. However, it has to be said there are a lot of preinstalled software on this device.

It is a nice UI, though, with plenty of customisations. In common with iOS there's no app tray, which means everything is visible on the home screen. It's easy to group apps into folders by dragging and dropping them on top of each other, though.

A pinch on the home screen brings up options to move apps, add widgets and alter the wallpaper and effects (the transitions as you move between home screens). A selection of Themes are also available from the Settings menu.

Pull down from the top of the screen and rather than your quick settings (these are available with a swipe from the right) you'll find recent notifications.

Verdict

On paper the Xiaomi Mi 4C is an excellent mid-range Android phone, with a fantastic spec for the money. However, overheating is a problem, and the issues we experienced with software out of the box make it difficult to recommend to the less technically-minded. ⊠ **Marie Brewis**

Specifications

5.5in full-HD (1920x1080, 401ppi) IPS display; CyanogenMod 12.1 (based on Android Lollipop 5.1); 2.5GHz Qualcomm Snapdragon 801 quad-core processor; Adreno 330 graphics; 3GB RAM; 64GB storage, no microSD support; 13Mp IMX214 5-lens rear camera with OIS and dual-LED flash, 1080p video recording; 8Mp front camera; dual-SIM dual-standby, with 4G on both nano-SIM slots, supports 1800-, 2600MHz UK 4G LTE networks; 802.11ac Wi-Fi; GPS; OTG; Bluetooth 4.0; fingerprint scanner; headphone jack; non-removable 4100mAh battery with Quick Charge; USB-C; 155.7x77.3x8.9mm; 175g

Build: ★★★★☆
Features: ★★★★☆
Performance: ★★★½☆
Value: ★★★★☆

★★★★☆

SMARTPHONE

ZUK Z1
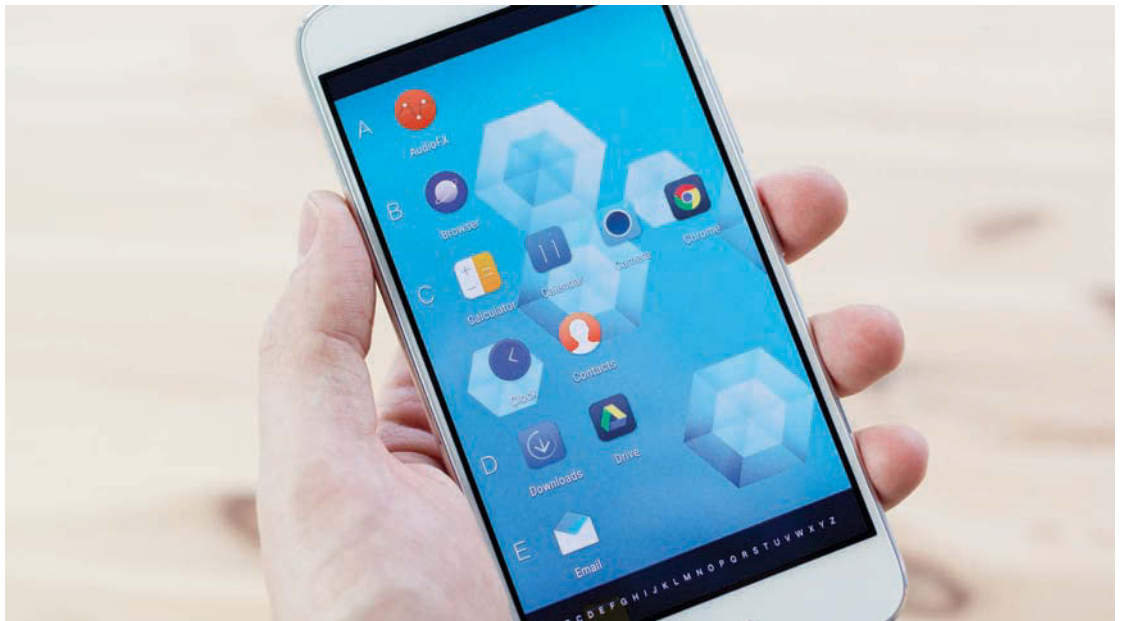
The Z1 is the first phone from Hong Kong-based ZUK, which is backed by Lenovo. A Chinese phone, the ZUK Z1 is available in the UK through sites such as Coolicool.com, where it currently costs £228. Coolicool has stocks in its EU warehouse, which means you won't be liable for import duty, and offers free shipping to the UK.

Design

Also available in grey, our white ZUK Z1 review sample has been likened to an iPhone 6s Plus by many an onlooker. The design is nice from the front and sides, with an aluminium frame, thin bezels and a rectangular home button that builds in a fingerprint scanner with metallic surround. We're not so keen on the rear, a shiny white plastic that makes the device appear much cheaper.

This rear cover isn't removable, but it doesn't need to be, with a massive 64GB of storage inside (of which around 53GB is available to the user) and a chunky 4100mAh battery that promises an average two days of use away from the mains. A dual-SIM tray pops out from the phone's top left edge, while you'll find a power switch and volume rocker on the right, a standard 3.5mm headphone jack at the top, and the charging port on the Lenovo's bottom.

The ZUK Z1 is one of several devices to adopt the new USB-C standard for data transfer and charging. Right now some users will find this an inconvenience, since the chances are the only USB-C cable you'll own is the one that comes in the Z1's box. But it's worth the hassle, because not only is USB-C reversible, meaning you can fit it in either way around without first having to work out which way is which, but it's futureproof and it's fast.

To the right of the USB-C port is a speaker grille. The single speaker on the ZUK Z1 is tinny and not particularly loud.

The screen on this mid-range Android phone is far more impressive, though. It has a full-HD (1920x1080) IPS screen with a pixel density of 401ppi. It's bright, clear and responsive, colours are realistic and viewing angles are good. The bezels are skinny, although there is an odd black border running along the screen edge.

Below the screen sits the fingerprint scanner and touch-sensitive back and options keys. The fingerprint scanner is a touch-style version that worked well in our tests. We also like the fact it can distinguish between a tap and a press, with the former operating as a second back button and the latter taking you home. (An option in the Settings menu lets you add onscreen controls if you prefer.)

The ZUK Z1 feels reasonably sturdy, and doesn't flex, creak or rattle under pressure. Some parts of the aluminium frame don't sit as flush to the screen as others, however. It's not visible by eye, but when running our fingers around the edge, we felt a small gap. We'd worry that, at least with the white model,

this thin channel could easily trap grime and spoil the overall design.

It's worth pointing out that this is a reasonably large phone, at 155.7x77.3x8.9mm and 175g. The slightly curved rear makes it a little easier to hold the Z1 in the hand.

Hardware

The ZUK Z1 is a mid-range phone and, as such, you can't expect to find the latest hardware inside. However, there is a 2.5GHz Qualcomm Snapdragon 801 processor – the same chip seen in some of 2014's flagship Android phones – and a generous 3GB of RAM inside. That's a similar setup to phones such as the Samsung Galaxy S5 and LG G3, for example, and the Z1 offers the same level of performance.

We found real-world performance very smooth, and the Cyanogen OS zipped along as we launched apps, played games and browsed the web.

Performance in our benchmarks was very decent for a mid-range phone. For measuring overall performance, we ran Geekbench 3.0, in which the ZUK Z1 recorded 998 points in the single-core component, and 2368 multi-core. We also ran AnTuTu, where the Z1 managed 41,406 points. In the GFXBench graphics test, the Z1 clocked 28fps in T-Rex and 12fps in Manhattan. Lastly, we ran SunSpider, and saw an average of 1280ms, which isn't bad for a mid-range Android.

The real star in performance terms, though, is the battery. ZUK has fitted the Z1 with a huge 4100mAh battery. It's not removable, but in our tests it could last a full two days (obviously your results will depend on your usage). Plus there's support for Quick Charge and, as we mentioned earlier, a reversible USB-C charging port.

Connectivity

Aside from the aforementioned fingerprint scanner, the ZUK Z1 has another neat addition that isn't seen so commonly in European phones: it's a dual-SIM dual-standby phone, and both its nano-SIM slots support 4G LTE. As long as you're not an O2 customer, that is – the Z1 doesn't support the 800MHz band in the UK, although there is support for 1800MHz and 2600MHz.

No microSD card slot is present, but with 64GB of storage inside and the availability of cloud-storage services, most users will have plenty of space for their needs. Other connectivity specs include dual-band 802.11ac Wi-Fi, Bluetooth 4.0 and GPS. The Z1 also supports USB OTG.

Cameras

On paper, the Lenovo ZUK Z1 sounds as though it should be a strong performer in photo and video, with a 13Mp IMX214 rear camera with OIS and a dual-LED flash, plus an 8Mp camera at the front. Video recording is possible at 1080p.

Outdoors, it is possible to get some decent shots, but bright sunlight or low light can cause problems, with the Z1 introducing noise or overexposing the shot.

The selfie camera is fine, but notably missing is a beauty mode.

Software

One of the most interesting aspects of this phone is the software it runs: CyanogenMod 12.1. This is based on Android Lollipop 5.1, and doesn't deviate too far from stock Android but adds several improvements.

We like the way the app tray is split into an alphabetical list, with a bar at the bottom allowing you to quickly jump to a certain character. We also like the bunch of free themes that are available to apply to your device. A couple of gestures are supported, including the ability to double-tap to either wake the screen or send it to sleep.

Verdict

The Z1 is a good first attempt from ZUK. It's not a super-cheap budget phone, but we think the price is about right given the hardware inside. Standout features include the 5.5in full-HD screen, large battery, 64GB of built-in storage and USB-C port. Although there's no removable battery or microSD card support, you could argue that you need neither. ⊠ **Marie Brewis**
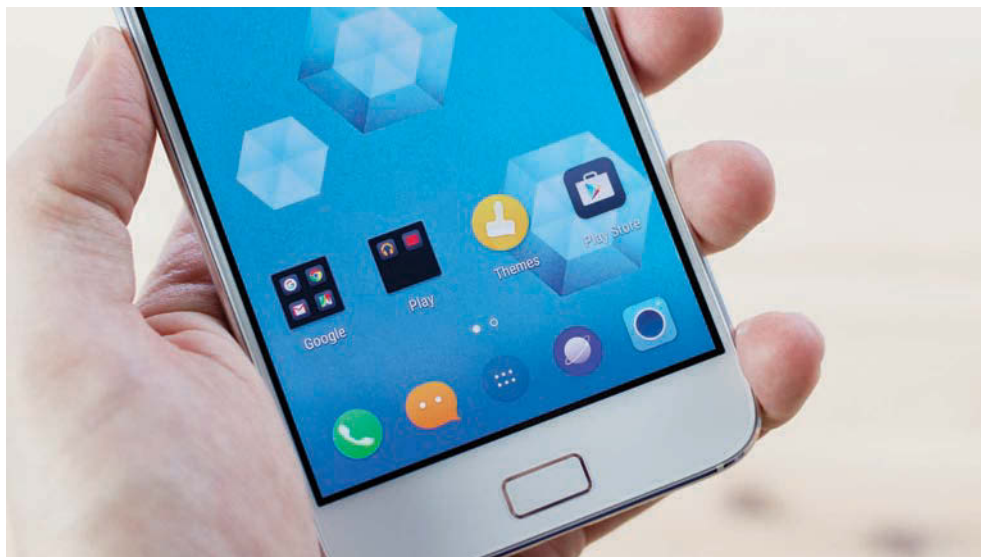
Specifications
5in AMOLED Full HD; Android 6.0 Marshmallow; Qualcomm Snapdragon 617 octa-core processor; 2GB RAM; 16GB internal storage; microSD card slot (up to 2TB); 13Mp camera with OIS and dual-tone LED flash; UltraPixel front camera; NFC; fingerprint scanner; 4G LTE support; 2150mAh non-removable battery 145.8x70.8x7.3mm; 143g

Build: ★★★★☆
Features: ★★★★☆
Performance: ★★★★☆
Value: ★★★☆☆

★★★★☆

SMARTPHONE
HTC One A9

HTC has unveiled a new smartphone to sit alongside its flagship model, the One M9. The Taiwanese firm doesn't have an official price for the One A9 on its website, instead it points visitors toward retail partners. The odd thing is that they all have different prices, ranging from £419 all the way up to £479.

A £60 price difference at launch is a bizarre situation, but worse is that this is a much higher price than we'd expected for the A9.

We know it's brand new and the price will drop over time like most phones, but for now it means that the flagship One M9 is available for far less. You can pick it up from Amazon for £369, and it's probably available for less if you hunt around.

Since the A9 is by no means a successor to the M9, we're not sure why HTC is thinking consumers will buy it instead. When you compare it to others on the market, things look even worse, with similarly specified phones, such as the Google Nexus 5X (page 37), the OnePlus 2 and Motorola's Moto X Play, all available for much less – £339, £239 and £279 respectively.

Design
Let's tackle the elephant in the room straightaway. The One A9 looks very similar to the Apple iPhone 6/6s. The shape, feels nice in the hand, although a little slippery, and the HTC is nice and thin at 7.26mm. A weight of 143g is light, too.

The phone is available in Carbon Grey and Opal Silver, with Deep Garnet and Topaz Gold options expected to be available before the end of the year. We love the red model, though gold seems to be the in vogue at the moment.

Compared to the One M9, the main addition to the A9 is the fingerprint scanner below the screen. It's similar to the OnePlus 2's in that you can use it to unlock the phone and as a home key.

Build quality is excellent and it's the little details that combine to make this a desirable phone. For example, the ridges on the power button make it easier to use and find with your finger. We also love the smooth edge of the glass, which sits flush with the metal. It's amazing how a slightly sharp edge gets on your nerves over time, but there's nothing like that here.

Hardware
The One A9 offers the same screen size and resolution as the M9 – 5in and Full HD. The display is crisp, offers good viewing angles, colours that pop out at you and excellent contrast thanks to the AMOLED technology. You shouldn't, however, need to pay over £400 for a screen of this quality.

You also get lower grade specs under the covers with the One A9. It has a Qualcomm Snapdragon 617 octa-core processor, 2GB of RAM and 16GB of internal storage. Luckily

there's a microSD card slot which, in theory, can take up to 2TB.

The benchmark results are not great (see opposite), but don't read too much into these as the One A9 performs perfectly well in everyday use. That's not to say it's the nippiest around, but equally it didn't leave us waiting for things to load. As usual, it's the camera app that can take a couple of seconds to boot.

HTC hasn't added its BoomSound front-facing speakers, which is a shame. The One A9 does support High Res 24-bit audio though, including upscaling and a DAC (digital to analogue converter).

Returning to the fingerprint scanner, its positioning isn't the best and we prefer rear-mounted readers or the Xperia Z5's, which is integrated into the power button on the side. This way your finger or thumb falls naturally on the scanner instead of having to reach for it. Next to the bottom-facing speaker, which provides average sound quality, is a regular Micro-USB port rather than the new reversible Type-C.

That said, the phone supports Quick Charge 2.0 for topping it up quickly. With the battery fully charged, you'll get pretty good battery life. Our Geekbench 3 test resulted in a respectable time of six hours 24 minutes, which puts it in the top bracket of performers.

Other connectivity options include NFC, 11ac Wi-Fi, Bluetooth

Geekbench 3

One A9	3084
One M9	3778
OnePlus 2	4094

0 — 500 — 1,000 — 1,500 — 2,000 — 2,500 — 3,000 — 3,500 — 4,000

GFXBench Manhattan

One A9	7fps
One M9	24fps
OnePlus 2	16fps

0 — 2 — 4 — 6 — 8 — 10 — 12 — 14 — 16 — 18 — 20 — 22 — 24

GFXBench T-Rex

One A9	16fps
One M9	50fps
OnePlus 2	46fps

0 — 5 — 10 — 15 — 20 — 25 — 30 — 35 — 40 — 45 — 50

SunSpider*

One A9	1455ms
One M9	867ms
OnePlus 2	1471ms

0 — 200 — 400 — 600 — 800 — 1,000 — 1,200 — 1,400

* lower is better

4.1 with aptX and 4G LTE support – exactly what we'd expect for a phone this expensive. Wireless charging would be nice, though.

Cameras

On the front, the A9 has the same UltraPixel camera as the M9. This is pretty good, but by no means the best. The rear camera is a 13Mp Sony sensor with a dual-tone LED flash.

Image quality is very good (see our test shot above) and a bonus is that the One A9 offers optical image stabilisation, an aperture of f/2.0 and support for shooting in Raw. Once again, the problem here is that you can get phones with similarly decent cameras for a lot less. HTC touts hyperlapse video (timelapse) as a key feature that can be applied to any video in your library.

Software

Coming later in the year than other smartphones has an advantage – the One A9 comes with Android 6.0 Marshmallow, making it the first non-Nexus device to do so.

It's a very different experience to a Nexus device, though, as the phone also comes with HTC's Sense user interface. This isn't a bad thing and existing HTC users might not want it any other way. We've all got our favourite Android skins. That said, HTC uses stock Android elements, such as the drop-down notification bar, including quick settings, and the card Rolodex-style recent apps, so Sense is closer to stock Android than previously.

Running Marshmallow also offers other advantages, such as

'adoptable storage', which means the SD card can be viewed as internal storage. There's also Doze mode, which improves standby battery life, and Now on Tap for quickly accessing Google Now.

Sense looks stylish on the One A9 and you'll get the same experience as you will on an M9, with features such as Themes; Sense Home, a widget that displays different app icons; as well as suggestions, based on where you are. BlinkFeed and Zoe are still key parts of the system.
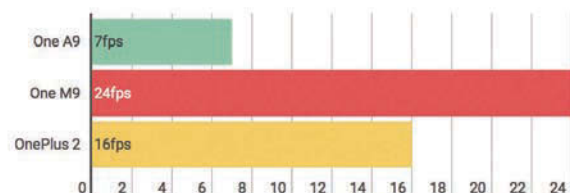
Verdict

We prefer the design of the One A9 to that of the flagship One M9 and it does have a decent fingerprint scanner. These are not, however,
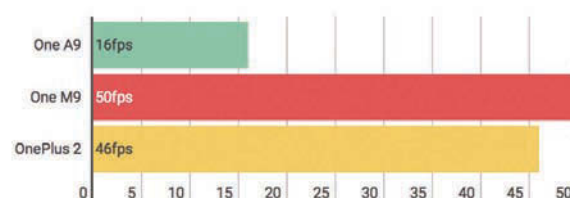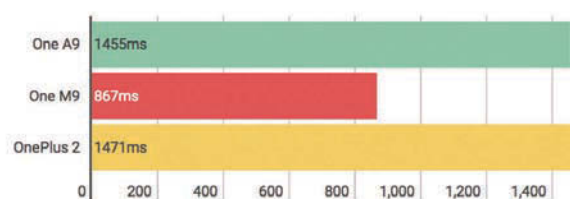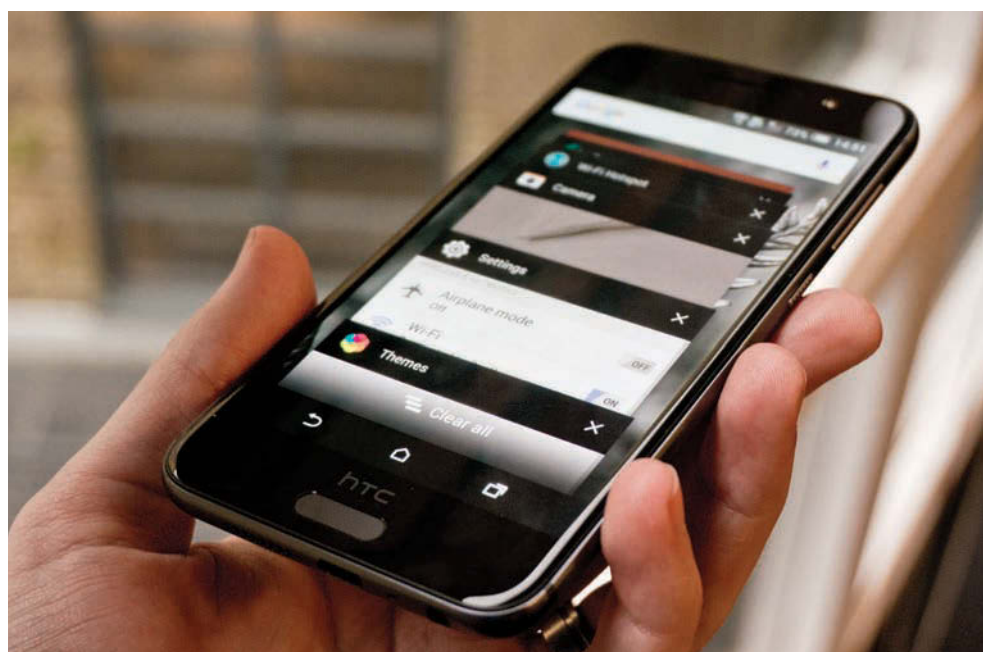
enough to justify buying it instead of its bigger brother or various even cheaper Android rivals. HTC has made a nice phone, but its price tag is too high. ⊠ **Chris Martin**

SMARTWATCH

Huawei Watch

Build: ★★★★½
Features: ★★★★☆
Performance: ★★★★☆
Value: ★★★½☆

★★★★☆

Huawei's Watch may not have the most inspiring name, but when it looks this good, it doesn't matter.

Our review model (priced £289) came with leather straps, while a watch with metal straps (pictured above) will set you back £329. That's more expensive than an Apple Watch Sport, which comes with a rubber band, but more importantly, the Huawei Watch is the most expensive Android Wear smartwatch around. This is a bit of a problem because although it's arguably the best looking, it doesn't offer anything which rivals don't when it comes to hardware or software.

Design

Our review sample had a silver body, though the company's black and gold designs look just as good. There are also two straps to choose from: leather or stainless steel. Interestingly, Huawei has placed the physical button at two o'clock rather than three, which makes sense to

us – you don't need to twist your wrist as much to push it.

Like many smartwatches, the Huawei Watch is big, so you've got to be prepared for this. It's a shame that the company hasn't followed Apple's lead and produced two sizes, including one for those with smaller wrists. The stainless steel case and sapphire crystal front look great, even if it is a bit chunky at 11.3mm. We're used to some Huawei devices being cheap and made from plastic, but this certainly isn't the case here.

It's easily one of the most premium and desirable Android Wear wearables around, and indeed smartwatches in general – it can pass for a stylish regular wrist

watch. Those tiny bezels play a big part in the wow factor and this is definitely a head-turner.

As well as looking great, it has an IP67 rating, so is dust-proof and will survive being dunked in up to 1m of water for a maximum of 30 minutes.

Hardware

The Huawei Watch fits in with the standard set of hardware for Android Wear devices. It has a Qualcomm Snapdragon 400 processor, 4GB of internal storage, 512MB of RAM and Bluetooth 4.1. It also has various sensors, including an accelerometer, barometer and heart-rate monitor.

The screen, however, is a little larger than rivals such as the LG G Watch R at 1.4in, but it's smaller

The Huawei Watch is easily one of the most premium and desirable Android Wear wearables around, and indeed smartwatches in general

don't always sit properly, so occasionally we thought the watch was charging when it wasn't.

Moving on to fitness tracking and the Huawei Watch comes preloaded with Google Fit, as you'd expect, but also the firm's own offering, Daily Tracking. This does the same job, but has a nicer interface.

The heart-rate monitor, like pretty much every watch with this feature, is hit-and-miss as to whether it can take a reading successfully. We often found we had to push the watch into our wrist to get it to work properly. You'll want a dedicated fitness watch if this is important.

That's a shame, but perhaps not as much as the fact that it doesn't have GPS, so those wanting proper tracking for running will need to look elsewhere. However, the Huawei Watch is compatible with Jawbone Up bands if you don't mind wearing a second device.

Software

As we mention in all our Android Wear watch reviews, the experience is in essence the same across the board. The price, hardware and design are all important when it comes to choosing them, but it's worth pointing out that the Huawei Watch comes with the latest version of the software. This means you get Wi-Fi support to use the device without a companion phone, and the new layout, which provides a proper app launcher and contacts list.

You also have the option to draw emojis if that's your kind of thing (it actually works really well if you can think of what to draw), but more important is its iOS compatibility. This means you can use the Huawei Watch with an iPhone – just bear in mind that it's by no means the same experience compared to using it with an Android phone (see page 112 for more).

Other than the usual Google Now card-style system of notifications, the Huawei Watch comes with a huge range of watch faces built in and, of course, you can download more, as well as the apps you want to use.

than the Motorola Moto 360, so it's not the biggest around. What's notable is the 400x400 resolution, which means it has the highest pixel density of any Android Wear device at 286ppi.

Round screens are becoming the norm for smartwatches, with a few exceptions such as the Sony Smartwatch 3. Huawei follows this trend, but doesn't have the 'flat tyre' effect found on Motorola's 360, which is still a sticking point even with the new 2015 version.

The display looks great, offers plenty of brightness should you need it, and it's also nice and responsive. The issue is that how you choose to use the screen has a big impact on battery life.

By default, the display is set to always on, although it will dim and change the watch face to a stripped back version. According to Huawei, the battery will last roughly two days. However, set the screen to switch itself off and you'll more than double the battery life.

Leaving it set to always on wouldn't be so bad if the charger was easy to use, but it's not. It's not a stand and although it attaches magnetically, the metal contacts

Verdict

At a lower price, the Huawei Watch would be the best Android Wear smartwatch on the market, but it's a little too pricey for our liking. Although it's absolutely stunning and the build quality is exquisite, the watch lacks GPS, the heart-rate monitor is disappointing and the charger is fiddly. ⊠ **Chris Martin**

You can use the Huawei with an iPhone – just bear in mind that it's by not the same experience compared to using it with an Android phone

Specifications
Android 5.1 Lollipop; GeForce Now game streaming; nVidia Tegra X1 processor with a 256-core GPU and 3GB RAM; 4K playback at 60fps; 16- and 500GB storage options; 802.11ac Wi-Fi and Bluetooth 4.1; HDMI 2.0; 2x USB 3.0; Micro-USB 2.0; microSD slot; 210x130x25mm; 654g

MEDIA STREAMER

nVidia Shield TV

PC ADVISOR
RECOMMENDED

Build: ★★★★½
Features: ★★★★☆
Performance: ★★★★½
Value: ★★★★☆

★★★★☆

NVidia is the latest company to enter the media streamer market, with its Shield TV. It's aimed at a different market to its competitors, though, and comes with a gaming controller alongside the standard remote. Indeed, it's been designed to allow you to stream your gaming collection from your PC to your TV, and even stream games via GeForce Now for instant gaming.

Design

Visually, the Shield is one of the best-looking media streamers you can buy, and it's not hard to notice the hat-tilt to the gaming community with its design, which resembles a mini gaming PC. It's in your face, with its green LED lights and protruding angles.

Much like Sony's PlayStation 4, the Shield can be laid on its side or stood upright, though you'll need to buy a stand (£24.99) to do the latter.

It measures 210x130x25mm and weighs only 654g, making it a relatively thin, portable device. In fact, we'd argue it's the perfect companion for travellers – the Shield is small and sleek enough to fit in a rucksack, and will provide you with entertainment in the form of on-demand TV and gaming anywhere you go that has Wi-Fi and a TV.

Alongside the standard remote, nVidia provides a gaming controller. This is pretty bulky and takes some getting used to, especially for those unfamiliar with the layout of an Xbox-esque controller. Two-player games are available on the Shield, so if you want to play with family or friends you'll have to fork out £49.99 for an additional controller.

One plus point for the controller is that its connected via Wi-Fi Direct, which provides incredibly low latency response times both when navigating the Shield UI and playing games. It's also compatible with the nVidia Shield tablet, giving you the freedom to game on the go with a controller rather than having to use a touch screen.

Software

In essence, the Shield is an Android Lollipop-powered TV. It includes Google Cast for mirroring content from Android and iOS devices (though iOS support is limited). The UI is one of the slickest, most responsive we've used. It's nice and simple, with everything you need at the touch of a button. You also have access to Google's Play Store, with a selection of apps and games designed to be enjoyed on a TV.

It comes with exclusive apps and features, including the Shield Games portal, which lists all the recommended Android games for purchase or free download from Google Play, all of which have been specifically optimised for use with nVidia's streamer. They include Half-Life 2 and Borderlands 2, with Resident Evil 5 expected to make an appearance in the near future. It's ideal for casual gamers that don't want to fork out up to £50 for the latest blockbuster game.

Being an Android TV, the Shield has voice control via Google Now. Simply hold the nVidia logo on the controller, or the mic icon on the remote, to activate the voice-recognition software, allowing you to easily open apps or search for content on the device. We were pleasantly surprised at how quickly it understood what we were saying and acted upon it.

Google Now also provides you with personalised recommendations on your home screen based on your activity and interests. It's a great way to explore new content.

The Shield also offers a service called nVidia GameStream, which enables gamers to stream their PC games to their TVs in full 1080p HD at 60fps over a local network. There is a catch though; gamers must have a compatible nVidia graphics card installed on their PC, and be logged into the GeForce Experience available for Windows. Once you've logged in, you'll see your entire compatible game library, ready for big-screen gaming.

There is, however, one huge disappointment when it comes to the software of the Shield. There's a handful of popular on-demand apps missing from its line-up, which could be a dealbreaker for some. While you'll find the likes of Netflix, Amazon Prime Video and BBC iPlayer available for download, it's missing other apps, such as All 4, Demand 5 and ITV Player/ITV Hub. Although it's a superb device for gaming, those who want to catch up on the latest goings on in *Coronation Street* or *Emmerdale* will have to look elsewhere.

4K support

One of the Shield's biggest selling points is that it supports native 4K output at 60Hz – the only other 4K media streamer available in the UK, the Amazon Fire TV, can only handle 30Hz at full 4K. This opens a new world of native 4K 60fps playback from the likes of YouTube playback was limited to 30fps, but should be upgraded at some point in the future. In fact, we were a bit disappointed overall by the quality of Netflix's UHD offerings, looking only marginally more impressive than the standard upscaled 1080p image we're used to watching – but that's not a fault with the Shield.

One noticeable element of the Shield that looks impressive in 4K is

the UI itself. The text, the icons and the graphics used by the Shield look crisp, with the experience reminding us of the first time we saw a Retina display after using the iPhone 3GS for two years.

Using either the USB 3.0 port or microSD slot built into the Shield, you're able to load up and play your own native 4K videos, which is where you'll really experience the impressive quality of 4K.

Hardware

The Shield uses nVidia's own Tegra X1 processor, a 256-core GPU, coupled with 3GB of RAM, making it the more powerful than any other media streamer on the market. This was borne out in our testing: apps loaded almost immediately, as did BBC and Netflix videos, and games were handled with ease.

The streamer also offers 802.11ac Wi-Fi, Bluetooth 4.1 and an IR receiver for compatibility with universal remotes, as well as Logitech Harmony. Storage wise, two models are available; 16- and 500GB. Connectivity options include two USB 3.0 ports that can be used with an external hard drive, and a microSD card slot to expand the amount of available storage.

GeForce Now

The best feature of the Shield is the inclusion of the nVidia GeForce Now cloud gaming service, which has been designed to be the Netflix of gaming. You get a three-month free trial, after which you'll need to pay £7.49 per month. At the time of writing, 50 games are available for instant streaming.

Popular titles include DIRT 3, a number of Lego games, Saints Row 3 and Red Faction: Armageddon. Granted, they're not the latest releases, but they'll suffice for a casual gamer bored on a Sunday afternoon. If you are interested in more recent titles, these are also available for instant streaming, though you'll have to purchase them first. Games such as The Witcher 3 are available to buy separately for as much as £49.99, which you might think is a bit much for a game only available on the Shield, but it isn't the case as you're also issued a Steam/GOG code to download it on to your computer.

Yes, the games are streamed over the internet but this doesn't mean a drop in quality – nVidia provides a maximum resolution of 1080p at 60fps. One of the biggest worries with game streaming is lag, one of the most frustrating things a gamer can experience when they're in the midst of a ferocious battle. We initially tried using Wi-Fi for game streaming, which was a huge mistake – the lag was terrible, with button presses taking seconds to register, making gameplay almost impossible. We should point out that the Shield wasn't near our

router, so those with better Wi-Fi connections than us may have a better experience.

Switching to an ethernet cable based connection cleared up these issues, and the experience quickly became an enjoyable one. In fact, we completely forgot that we were streaming the games as the responses were instant, akin to what you'd expect when playing the PlayStation 4 or Xbox One. There was a drop in quality at times (full 1080p at 60fps requires 50MB/s download speeds), but not enough to become a regular issue.

GeForce Now is a fantastic option for anyone who doesn't want to fork out for an Xbox One or PlayStation 4 and then £50 per game after that, but instead want a library of games available to play through casually at our own pace. It's also a great option for those with young kids that want to play games. Sure, for dedicated gamers the library may seem a bit sparse, but the premise is good and we hope that the list of games improves over the coming months as the service becomes, without a doubt, more popular.

Verdict

We're extremely impressed by the nVidia Shield both as a media streamer and as a games console. Indeed, it's close to being perfect, but without access to popular apps, it just falls short. ⊠ Lewis Painter
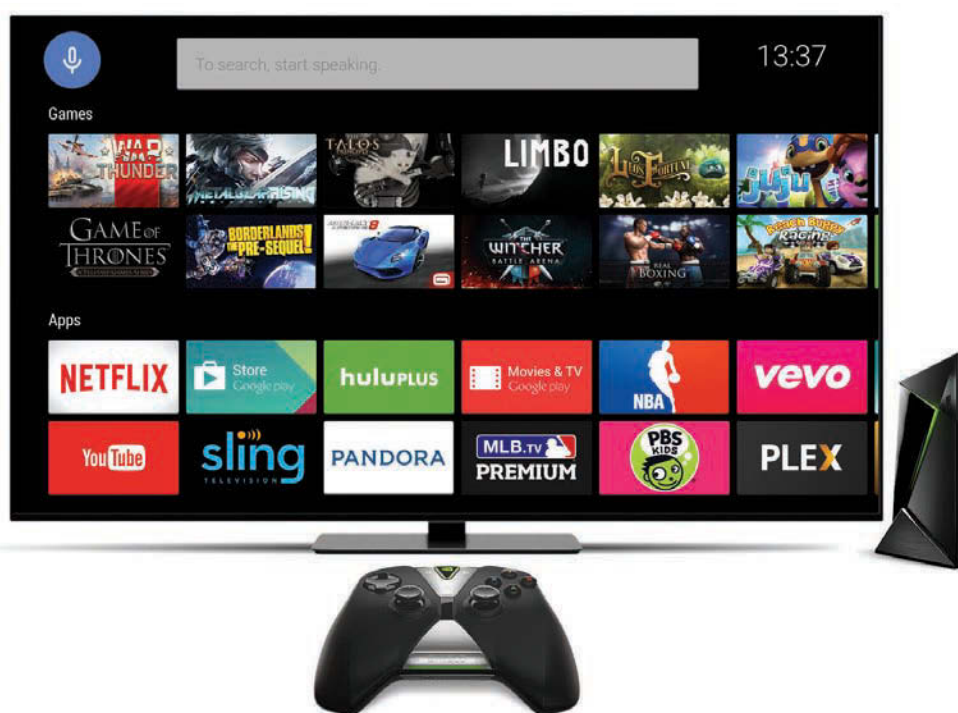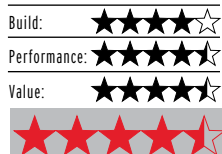
£8.80 inc VAT

Contact
■ umidigi.com

Specifications
1.2m cable; 13mm speaker dimension; 100+/-3dB speaker security; 3mW power input (max); 3.5mm connector plug; 16g

HEADPHONES

Umi Voix

PC ADVISOR
RECOMMENDED

Build: ★★★★☆
Performance: ★★★★½
Value: ★★★★½

★★★★½

The Umi Voix is a super-cheap-in-ear binaural headphone set with microphone. With a standard 3.5mm jack, the Umi Voix works with virtually all smartphones, tablets and audio players, offering a good value option for those who like to listen on their daily commute.

The Umi Voix is not widely available,ut head over to Tomtop (tinyurl.com/p54u2g7) and you can pick up the Umi Voix for the low price of £8.80. Elsewhere we found them retailing for £13 or £14. But availability is limited. If you can get it, though, there is value to be had here. Because although the Umi Voix are far from stellar, they are a lot better than you have any right to expect for that price.

In part this is because the design and build is high quality. Or at least, it seems that way to us. The Umi Voix has a stylish smokey grey chrome finish. This is tipped with red highlights. The lengthy cable is flat, which is always good for headphone longevity and the avoidance of tangles. The 3.5mm jack is gold plated, and rubber is used judiciously to protect the delicate parts of the Umi Voix. We used and abused the Umi Voix for several weeks with no defects.

On the wire is a remote. It has a multi-function single button, which is a good feature that works well. But this is the only part of the Umi Voix that felt cheap to us.

The Umi Voix's earbuds are not the smallest, but we found it very comfortable in our ears. Even when running (drenched in man sweat) they sat comfortably and firmly in our lugs. And we found that the drivers directed audio down into our eardrums – avoiding a common pitfall of cheap headphones. Only at very high levels of volume was there any audio leakage.

Overall, we think the Umi Voix looks and feels like a much more expensive set of headphones. But how does it sound?

Pretty good. Certainly good enough for the casual listener to digital music, podcasts, radio and the like. Umi tells us that the Voix sports a "true sound audio curve", as well as a helical aluminium sound chamber. It has 13mm drivers and the end result is strong, clear, bass, which most people will enjoy. Some may find it overpowering when listening to very bassy music.

The top end is not as impressive. At times we heard a little distortion on trebles when we were playing heavy guitar music turned up to 11. It isn't a major flaw, but it is there.

But in general the listening experience is very good, whether it be music of virtually all genres, or podcasts and talk radio.

Verdict

At this price you can't go wrong: and Umi certainly doesn't. If you can find them, at £8 to £14 the Umi Voix offers style, audio quality and excellent build quality at a staggeringly low price. Recommended. ⊠ **Matt Egan**

Specifications
2x 1200Mb/s Powerline adaptors; 1x gigabit ethernet port per adaptor; 128-bit AES (Advanced Encryption Standard); IEEE 1901/HomePlug AV2; TPL-421 has passthrough power sockets on each adapter unlike the smaller TPL-420

Build: ★★★★☆
Features: ★★★½☆
Performance: ★★★★½
Value: ★★★½☆

★★★★☆
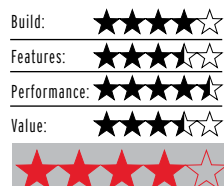
POWERLINE ADAPTOR

Trendnet Powerline 1200 AV2 Adapter Kit

Homes increasingly require fast networks for smart TVs, DVRs such as Sky+ and Tivo, games consoles and the rest. For many of us our Wi-Fi just can't keep up, and so we need a super-fast wired network to empower all our smart internet-ready devices.

Powerline is a technology that's ridiculously easy to set up, and creates a wired home network in a matter of minutes. It uses your existing home electrical wiring to transmit data from your modem/router to the room where all your home entertainment and digital devices live. The latest, fastest variant of Powerline is labelled Gigabit 1200Mb/s, superseding older 200- and 500Mb/s versions.

The Trendnet Powerline 1200 AV2 Adaptor Kit (TPL-420E2K) is one of the fastest Powerlines we've tested to date. And at its entry level, it's inexpensive, too.

First a warning. Forget about the claimed speeds on any Powerline, from any manufacturer. These 500- or 1200Mb/s speeds are theoretical maximums, and you'll be lucky to reach over 100Mb/s in most real-world scenarios. Don't worry though, as even an average 500Mb/s Powerline (apparently trudging at 60- to 70Mb/s) will greatly speed up your catch-up TV or Internet download times.

Design
There are two versions: the basic Trendnet Powerline 1200 AV2 Adaptor Kit (TPL-420E2K) is compact, and the cheaper of the two models. The Trendnet Powerline 1200 AV2 Adaptor Kit (TPL-421E2K) is larger as it includes a passthrough power socket so you don't lose a valuable socket where you need it most – near all those internet-hungry devices.

Trendnet has kept these two Powerline adaptors reasonably small, so they won't make your front room look like a tech toy room. As stated above, the 421E2K model is larger because of the handy passthrough socket.

They both models lack features that you may desire, though. For example, each adaptor features just the one gigabit ethernet port. If you have multiple devices (smart TV, Tivo, Sky+, games console) that one port is not going to connect everything to your network.

You can, of course, swap out the ethernet to the device you need at the time, but this can be a pain. Or you can invest an extra £20 or so on an extra multi-port Ethernet Switch.

Other Powerline adaptors offer two or even three ethernet ports on that second room adaptor, which you may want to consider instead. If you just need the one, then this is not a limitation that will bother you.

Setup, as with all Powerlines, is a breeze: plug one adaptor into a wall power socket near your modem/router, and connect with the supplied ethernet cable. Then plug the second adaptor in to a socket near the TV or whatever device you want to hook up to your network, and connect via ethernet. That's it.

Some other Powerline adaptors boast a wireless function that creates a new Wi-Fi hotspot in that second (or third or fourth) room. This is especially useful if you suffer a degraded wireless signal in different parts of the house. Neither model of the Trendnet Powerline 1200 AV2, however, has this capacity.

If you are limited on power sockets you should go for the TPL-421E2K with its passthrough socket – otherwise you will in effect lose a power socket in each of the rooms you install into. Don't be tempted to plug it into an extension block as this will noticeably affect download speeds.

If your wall sockets are close to the ground you might prefer a Powerline adaptor with the ports on the top. Having the ports on the bottom of the adaptor (as here) is neater but not if the wall socket is close to the floor.

Performance
Creating a perfect test environment for Powerlines is impossible as everyone's house will have different circumstances; and even the same house environment will behave differently at different times.

The Trendnet Powerline 1200 AV2 scored excellently, easily surpassing 500Mb/s-rated adaptors and just shading ahead of some other 1200Mb/s Powerlines.

Our average real-world speed score for these latest adaptors was 105Mb/s – miles below the claimed 1200Mb/s but enough to greatly improve on your home network if you rely on standard Wi-Fi. The Trendnet adaptors reached 110Mb/s. You may well get even faster speeds. It all depends on your home set up, electrical wiring, and whatever else you have plugged into the circuit. Battery chargers and microwaves, for example, will ruin your Powerline speeds when switched on.

We have got over 400Mb/s with a 1200Mb/s-rated Powerline, but in a less realistic situation with the two adaptors next to each other on a wall socket. Once separated by a couple of floors and 15m or so the environmental limiting factors of a house set in. But even at a real-world 100Mb/s, Powerline will dramatically improve your download times in the second room.

Verdict
Powerlines create fast home networks with the minimum of fuss, and this Trendnet is one of the fastest we've tested. ☒ **Simon Jary**

£92 inc VAT

Contact
- epson.co.uk

Specifications
Print resolution, 5760x1440dpi; Scanner resolution, 1200x2400dpi; Connectivity – Wi-Fi; USB; Apple AirPrint; 100-sheet A4 paper tray; 390x341x138mm; 6.2kg

Build: ★★★☆☆
Features: ★★★½☆
Performance: ★★★★☆
Value: ★★★☆☆

★★★½☆

INKJET PRINTER

Epson Expression Premium XP-530

Most inkjet printers under £100 use four coloured inks for printing documents and photos. These low-cost printers also tend to use just two ink cartridges – one cartridge for the black ink, and a second 'tri-colour' cartridge that holds the cyan, magenta and yellow inks for colour printing.

Epson's Expression Premium XP-530 is an exception to that rule. It's still very affordable, at around £90 but, as the name implies, it's also a 'premium' printer that uses five inks to enhance the quality of your photo prints. There's a conventional black ink cartridge for printing simple text documents, but the cyan, magenta and yellow cartridges are complemented by a 'photo-black' ink that is designed specifically for printing photos.

The results are pretty impressive, with smooth text output that isn't quite laser-quality, but should still be more than adequate for most home users. Colour graphics also work well, so the XP-530 will be a good option for students who need to print reports, or home workers who want to print out the occasional marketing brochure. Print speeds for both types of document come in at about nine pages per minute, which is also perfectly respectable for a printer in this price range.

However, it's the printer's photo output that really shines. That extra photo-black ink really adds crispness and contrast to photo prints,

while the printer's 5760x1440dpi resolution ensures that images are sharp and detailed. And, at just 34 seconds for a 6x4in postcard, the XP-530 also proves brisk when churning out your holiday snaps.

The only disadvantage here is that using five inks can push up the printing costs a bit. Using Epson's standard black ink cartridges for text printing works out at a hefty 3.8p per page, which isn't great value at all. Using the high-yield XL cartridges brings that down to 2.7p per page, which is still a little higher than we'd have liked but not extravagantly expensive.

Colour printing comes to 7.2p per page with the standard cyan, magenta and yellow cartridges, and a competitive 5.2p when using the XL cartridges. However, you will need to add another 3p when printing photos, because of the extra cost of the photo-black ink. That does makes the XP-530 a little more expensive than a conventional four-colour inkjet printer for photo output, but if you're a serious photographer and you want really high-quality photo prints then the XP-530 is about as good as you'll get for less than £100.

Using five separate ink cartridges also helps to reduce waste, as you need only replace individual cartridges as they run out, whereas the tri-colour cartridges used by most inkjets have to be replaced even if one of the inks has run out.

Other features include a built-in A4 scanner and copier, and duplex printing. The XP-530 includes Wi-Fi and USB connectivity, along with Apple's AirPrint for printing from iOS devices, and Epson's own Epson Connect feature that allows you to print over the Internet by emailing photos to the printer when you're away from home.

There are a few rough edges, though. The 100-sheet paper tray feels flimsy, and the tiny LCD screen may leave you squinting to read some of the menu options and settings, but those are minor flaws in an otherwise impressive printer.

Verdict

You'll need to keep an eye on running costs, but the XP-530 will be a good option for people who don't need to print lots of documents every day, but who do need high quality for photos and other documents. ⊠ **Cliff Joseph**

Using five separate ink cartridges also helps to reduce waste, as you need only replace individual cartridges as they run out

Specifications
Compatible with iOS and Android USB power adaptor

SLEEP TRACKER

Misfit Beddit Sleep Tracker

Beddit is a smart sleep tracker that's designed to help you monitor your sleeping patterns, so you'll know whether you had a good night's sleep, and get tips about how you can improve your sleep quality.

Connect it to your smartphone or tablet via Bluetooth, and every morning, you'll get a sleep score on the dedicated app, also available for Apple Watch. That score is based on seven categories: amount of sleep, time to fall asleep, sleep efficiency, away from bed, awake, restless sleep and snoring. It'll measure your heart rate and respiration throughout the night, too.

The narrative that is supplied with the Beddit data is informative, but maybe a bit too much information for general use. We think it's really aimed toward people concerned about sleeping disorders rather than just a general awareness of how they sleep. But, of course, it's not a medical device, so anyone concerned about their sleeping habits should consult a doctor rather than rely on Beddit.

For us, the Misfit Shine, which is made by the same company as Beddit, offers enough sleep tracking data to satisfy our curiosity, and that's in addition to the fitness tracking functionality that the Beddit doesn't have.

What's unusual is that the Beddit can tell you if you have snored. It might sound like something you don't want to know, but it's great for those wanting to prove to their partner they're being kept awake.

Design

Unlike other sleep monitors, including the Shine, Beddit isn't wearable. Instead, you stick the super-thin, flexible strip beneath your bed sheet and sleep on it, so you shouldn't notice that it's there. The downside is that Beddit needs to be plugged in and turned on and off each time you use it, which was difficult for us because our plug socket is behind bedside table. What it needs is a switch on the power lead for convenience.

There's a strong adhesive strip that's used to stick the Beddit to the mattress, which means people who regularly turn their mattress will have to use their own double-sided tape to stick it back down. You'll need it to be strongly secured, too, because if you tend to move around in the night and the Beddit moves with you you're unlikely to get an accurate reading.

Plus, if you're sleeping in a double bed on your own and decide to roll over to the other side of the bed, the Beddit will no longer track you because it's only the width of a single bed. Of course, that's a good thing if you are sharing your bed with someone else, as it means it'll only track you.

The app

Ultimately, though, it's difficult to tell how accurate Beddit is. It offers different results to the Shine, which we wore at the same time for several nights. On one night, Beddit registered that we were awake for 44 minutes that we weren't aware of, while the Misfit suggested that we'd slept quite solidly.

That said, the app is easy to use,. Overall, Beddit will be able to help you paint a picture of your sleeping habits that you could use to get some insight into what time you should aim to go to bed each night, and whether particular evening activities or foods are affecting how well you sleep, for example.

Plus, the app includes a smart alarm that can wake you up when you're in a light sleep to help reduce grogginess in the mornings.

Verdict

At a price of £106, it's difficult to recommend this product, particularly as it has several annoying factors like the lack of an on-cable power switch and an attachment system that isn't reusable. However, for a small number of health fanatics or ultra-curious sleepers, Beddit will give you all the data you're looking for in one easy-to-use app. ⊠ **Ashleigh Allsopp**

Build: ★★★☆☆
Features: ★★⯪☆☆
Performance: ★★★☆☆
Value: ★★☆☆☆

★★⯪☆☆

Specifications
7in 1024x600 capacitive touchscreen; Android 5 (Lollipop); 8GB storage; 1.3GHz quad-core processor Mediatek MTK8127; 2Mp main camera; 0.3Mp front camera (640x480 max video resolution); 3.5mm headphone jack; Micro-USB sync/charge port; microSD slot (32GB max); Micro-HDMI output; Wi-Fi (802.11b/g/n); Bluetooth 4.0; 240x170x60mm; 581g; 1-year warranty

Build: ★★★☆☆
Features: ★★★★☆
Performance: ★★★☆☆
Value: ★★★★☆

★★★★☆

TABLET
Kurio Tab 2

Children's tablets are improving, with many now being 'proper' tablets instead of 'toys'. They have proprietary app stores and none of the apps your kids actually want. Kurio reckons it has come up with the best yet in the Tab 2.

We're always wary of any product that claims to be the ultimate, but Kurio goes even further with the Tab 2, saying it's also the "safest tablet for kids". It's not perfect, but it is one of the better options if you don't want to hand over your iPad (or buy your kids their own).

It's similar in some ways to LeapFrog's new Epic tablet, which we looked at last month, but it runs a newer version of Android which you can freely access.

Design
This is a decent-looking 7in Android tablet, which comes with a protective rubber bumper that's more streamlined than usual. This covers the corners and should prevent damage from the inevitable drops the tablet will endure during its life. A removable plastic cover at the back slots into the bumper in two places to offer two viewing angles, but it's hard to attach.

There are front and rear cameras (0.3- and 2.1Mp respectively), Wi-Fi, Bluetooth and a Micro-HDMI output. There's also a mono speaker, headphone jack and a microSD card slot for adding up to 32GB on top of the internal 8GB (only 1GB of usable storage is available out

of the box). The Micro-USB port is used for charging and synching, and also supports USB OTG (on-the-go), so you can access files stored on a compatible flash drive.

The tablet is well built, but the screen specs are below expectations. We've long criticised Children's tablets for having low resolutions, but more importantly poor viewing angles. The Tab 2's 1024x600 resolution is the same as that of the new £49 Amazon Fire, but the fact that Kurio didn't opt for an IPS screen means colours don't look right unless you're looking square-on.

We could also level criticism at the poor-quality cameras, but the Amazon Fire shares the same specs. We've yet to see a kids' tablet with acceptable video and photo quality at any price. Opposite are a couple of photos which show the poor quality of the rear camera (the front is even worse).

Performance is mixed. The quad-core processor is speedy enough, but sometimes apps take a long time to load and the screen isn't always sensitive to a light touch and a firmer press is needed to register a tap.

Software
Software is just as important as hardware on a kids' tablet. Kurio's system isn't nearly as slick as Amazon or LeapFrog's, with small, hard-to-read icons and a less-

than-intuitive interface. It needs an overhaul. A few apps, games and ebooks are preloaded, which means that once you've set up a parent account and your child's profile (and installed any over-the-air updates), it's ready to go with hours of fun before you need to install any new apps.

That's the theory, anyhow. In practice, we were miffed to find that some of the apps were in essence trials, so within five minutes our four-year-old tester was asking us to buy new deserts to make in Smurfs Bakery (you can make only one iced lolly – the other treats are locked out). Other games include adverts and in-app purchases, while others are ill-suited to children who can't read. No instructions are read aloud (as you get with LeapFrog games), so you'll need to be on hand to explain how to use most apps.

It's not all bad: there are five Motion games that use the front camera in a similar way to the LeapFrog LeapTV to put kids in the action and get them to be active while playing games. This is where the stand comes in, allowing you to prop up the tablet, so you can play the games hands-free. And if you buy an inexpensive Micro-HDMI to full-size HDMI cable, you can hook up the tablet to your TV and see the game on the big screen. Some of the games have a two-player mode, too.

We also like Kidoz TV app, which has a selection of content from YouTube suitable for kids, from the Care Bears and Fireman Sam through to CBeebies content such as My Pet and Me. Similarly Kidoz Buzz is a curated stream of online videos and from home-recorded clips of animals doing funny things to excerpts from films or TV shows.

Plus, unlike many children's tablets, you have access to the full Android Lollipop operating system, complete with the Google Play store where there are more free apps than the tablet can hold.

There are all the other Google apps including Gmail, YouTube, Maps and Photos, the latter of which is authorised by default in each child's profile. It's also good that Kurio uses Android profiles rather than its own system, so it's easy to switch between profiles and manage content. It also means that as the child grows up they can remove the bumper and graduate

to using full Lollipop and not be stuck with a kids' tablet.

When you install an app from Google Play, you're asked to assign it to a category so that it appears in the right place in the child interface and also because of the time limit system.

The system is pretty good, but it could be better. You can't, for example, set different time limits for play and learning/reading, just the 'authorised hours' between which the tablet is usable and a Daily Play Time, which is the number of hours the child can play on the tablet. You can't set multiple periods per day, but you can set different times for different days. Children get a warning banner that appears when their time is almost up, and a parent can enter their PIN to add a few minutes' extra time to finish off an activity. This offsets the rather coarse session length and pause length settings, which are adjustable in only 30-minute increments. These enable you to limit how long the child can use the tablet continuously, and how long they must wait until they can continue using up their Daily Play allowance.

Another disappointment is that nothing is changed or tailored for different ages. You merely get a zero to seven age bracket. Which, of course, is nonsense. Needs and abilities change vastly from three to seven, and it would have been nice to see age appropriate apps appear when you create a profile.

Verdict

The Tab 2 is almost great. It combines a proper Android tablet
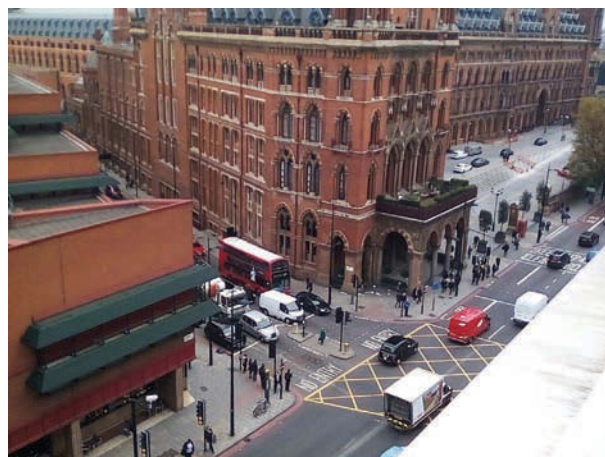
with child profiles and some decent apps. However, the software could be slicker and the screen better quality. It's pretty good value if you can find it for under £80, though, but at the recommended £99, you're better off going with Amazon's Fire Kid's Edition, which comes with a year's subscription for Fire For Kids and a two-year warranty that covers accidental damage. It may lack Android and Google apps, but it has a much better screen. ☒ Jim Martin

System requirements
1GHz) or faster x86-bit or x64-bit processor with SSE2 instruction set; 2GB RAM; 3GB disk space; 1280x800 screen resolution; DirectX 10 graphics card; Windows 10, 8.1, 8, 7 Service Pack 1, 10 Server, Server 2012 R2, Server 2012, or Server 2008 R2; internet connection; Microsoft account

★★★★☆

SOFTWARE

Microsoft Office 2016

Office 2016 is a major upgrade, but not in the way you'd first suppose. Just as Windows 10 ties notebooks, desktops, phones and tablets together, and adds a layer of intelligence, Office 2016 wants to connect you and your coworkers together, using some baked-in smarts to help you along.

Collaboration in the cloud is the real difference with Office 2016. Office now encourages you to share documents online, in a collaborative workspace. Printing out a document and marking it up with a pen? Medieval. Even emailing copies back and forth is now tacitly discouraged.

Microsoft says its new collaborative workflow reflects how people do things now, from study groups to community centres on up to enterprise sales forces. But Microsoft's brave new world runs best on Office 365, Microsoft's subscription service, where everybody has the latest software that automatically updates over time. And to use all of the advanced features of Office, you must own some sort of Windows PC.

You could still buy Office 2016 as a standalone product: it costs £119 for Office 2016 Home and Student (Word, Excel, PowerPoint and OneNote) and £229 for Office Home and Business, which adds Outlook 2016. Office 365 is £5.99 per month for a Personal plan (with one device installation) and £7.99 per month for a Home Plan, where Office can be installed on
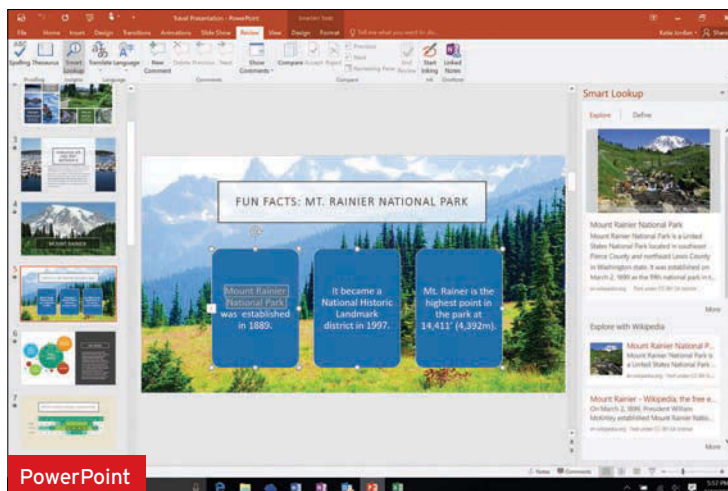
PowerPoint

five devices and five phones. If you subscribe to Office 365, it's a moot point; those bits will stream down to your PC shortly. Windows 10 users already have access to Microsoft's own baked-in, totally free version of Office, the Office Mobile apps. It's those people who fall somewhere in the middle – unwilling to commit to Office 365, but still wavering whether or not to buy Office – who must decide.

Our advice to an individual, family or small business owner: wait. If you've never owned Office, the free Office Mobile apps that can be downloaded from the Windows Store are very good – and include some of the intelligence and sharing capabilities built into Office 2016. Office web apps do the same.

There's no question that Office 2016 tops Google Apps, and we

haven't seen anything from the free, alternative office suites that should compel you to look elsewhere. But Microsoft still struggles to answer the most basic question: why should we upgrade? Read on to find out.

Excel

Microsoft can't mess too much with Excel, which is the most indispensable component of Office. Entire professions live on Excel as their everyday tool. Like modern calculator apps, however, Excel must meet the needs of a disparate group of individuals: statisticians and accountants, to name just two. One new feature (also available in PowerPoint and Word) stands out: a small box in the ribbon that says, 'Tell me what to do'.

The 'tell me' box is in essence a search box, much like Bing. But while Bing or the Smart Lookup feature adds context around the phrase in question, the 'tell me' box cuts through the numerous menus and submenus. If you'd like to know how to justify a group of cells, for example, you can begin typing 'justify a group of cells.' Excel will begin making suggestions that change as you continue typing. You can also choose to look for help on that specific topic, or do a Smart Lookup search instead. What the 'tell me' box does, though, is simply to do what you tell it to.

That's both good and bad. While 'tell me' takes you directly to a command, it doesn't tell you where that command is located. So if you want to perform that command again, you're none the wiser.
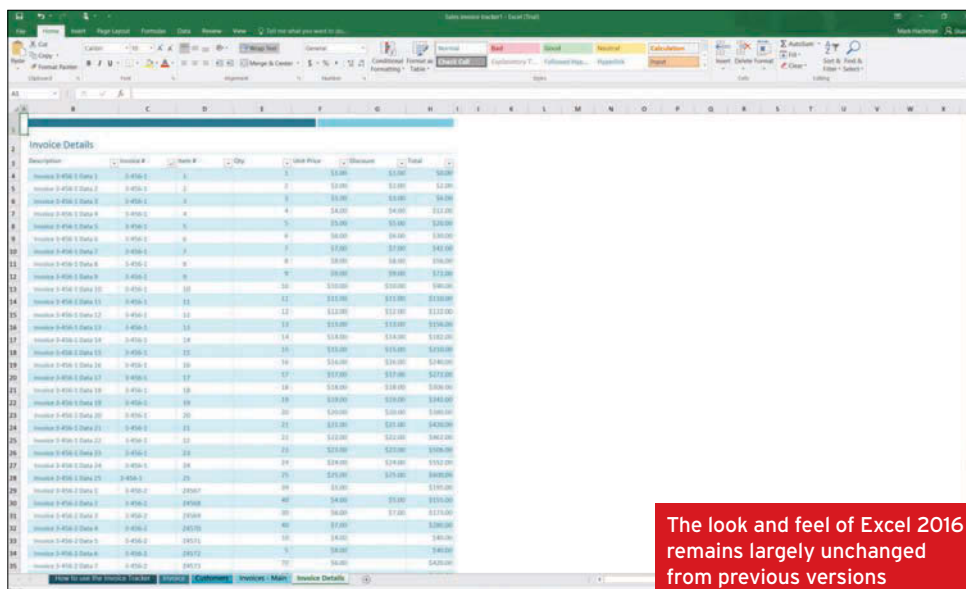
The look and feel of Excel 2016 remains largely unchanged from previous versions

We've typically thought of Excel, like PowerPoint, as an offline application. Not any more. Not only does it make more sense to post a link to an online workbook that others can use and manipulate, the complexity of these documents means emailing them back and forth simply isn't practical. Instead of interacting with a document, Excel users now have a virtual workspace. We were also shocked to see that Excel loaded only a handful of templates if we weren't connected.

Under the hood, those who rely on the program are going to find lots to like in Excel 2016, with pivot tables that can handle dates, plus new charts and graphs that emphasise business intelligence – the new watchword for Excel. Excel 2016 also adds the ability to forecast results, extrapolating revenue growth, for example, a few years down the road. You'll also find Power Query, an Excel feature that lets you pull in 'live' sources of data from databases and web pages, or your own corporate data. We rather like a feature that allows you to write equations by hand – handy on the Surface – although the recognition algorithm is still a little wonky.

We're not sure why Power Pivot, Power View, and Power Map – all tools that make up Microsoft's business intelligence vision – are off by default (you can enable them in the Settings menu). It's also not clear whether Microsoft was able to fix a bug that prevented Power Queries from being updated on the older Excel 2013 by the release date. What you'll probably be happy to find is a hefty number of preformatted templates that allow you simply to plug in numbers, rather than creating a template from scratch.

Note that Excel (and PowerPoint) use staggered, turn-by-turn, quasi-real-time collaboration. We're told, however, that changes are coming to each of these apps to enable Word's real real-time collaboration.

Word

Word is the other main application in Office, and it, too, is reassuringly the same for the most part. Microsoft's particularly keen to sell users on one new feature: Smart Lookup, also known as Insights.

Right-click a word or phrase in Word 2013, and a limited number of
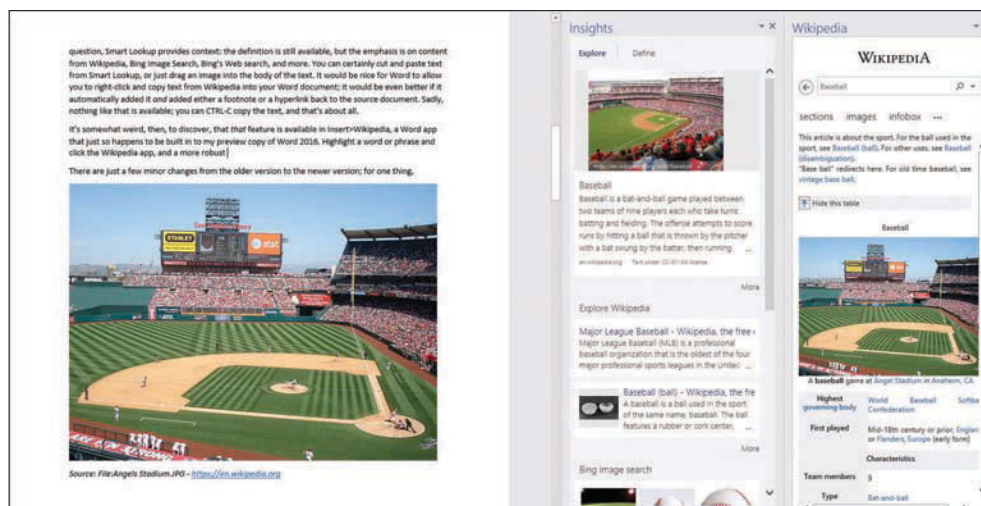
options pop up: a small formatting window, as well as options for spelling, linking the phrase, and checking grammar. In Word 2016, you get more, including options to translate the word or phrase, find synonyms, and so on.

With Office 2016, Smart Lookup takes the Review > Define command from Word 2013 and supercharges it. With both the old Define and the new Smart Lookup, a righthand pane provides additional information. But whereas Define used Bing to explain the word in question, Smart Lookup provides context: the definition, plus content from Wikipedia, Bing Image Search, Bing's web search, and more. You can cut and paste text from Smart Lookup, or drag an image into the body of the text.

It would be nice for Word to allow you to right-click and copy text from Wikipedia into your Word document; it would be even better if it automatically added it and added either a footnote or a hyperlink back to the source document. Sadly, nothing like that is available.

It's somewhat weird, then, to discover that feature in Insert > Wikipedia, a Wikipedia app for Word that was built into our preview copy of Word 2016. Highlight a word or phrase and click the Wikipedia app, and a more robust version of Wikipedia opens up. Even better, any image that appears in the pane can be clicked once to add it to the text, with attribution (and license info) automatically appended. It also searches on any text you highlight as you're writing or editing. These are all nice touches.

Not so nice is the portal to the Apps for Office store, which has not been updated for Office 2016. A

lack of Office apps or plug-ins is one thing, but you still can't see what others have said about the apps in question. There's also a big 'Trust It' button that basically serves as a warning to download plugins at your own risk. No wonder the apps for Office store basically failed.

Note that all these additional insights, however, can seriously cramp anything but a widescreen monitor. You could potentially have a document recovery pane, revision pane, Insights pane, and Wikipedia pane all bracketing your main document. On a standard 1080p monitor, however, it looked just fine.

PowerPoint shows collaboration's pain points

PowerPoint – the tool of most presentations – is a good place to talk about what Microsoft is trying to accomplish with collaboration, and where it struggles.

In the upper-right corner of most of the Office 2016 apps you'll see a new 'Share' button, which is where collaboration takes place. For now, however, the sharing experience differs sharply between apps such as PowerPoint and Word.

Here's how real-time collaboration works within Word: to share a document, you first save it to the cloud. Then you invite one or a series of people to edit it, using the Share button, which opens up an in-app message box. You can also eliminate all that and simply send a link. (Permissions are built in, so you can send one link to view, and another to edit.) We found using a link was better for casual editing, as the recipient can simply open the document as a 'guest' in Word Online, rather than needing to type

A comparison between Smart Lookup and the Wikipedia app. Note that the attribution is automatically appended via Wikipedia
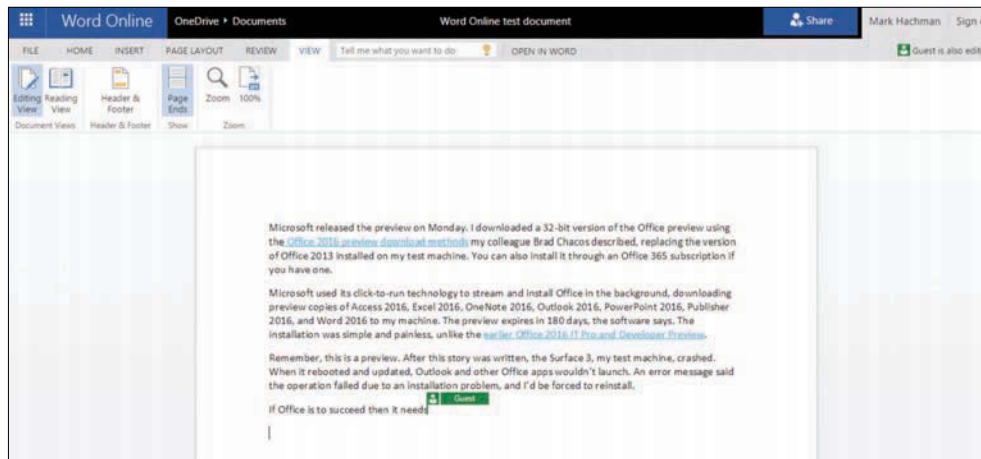
This is how real-time collaboration is supposed to work: colleagues edit your documents on the fly, with small flags to show who's doing what

in his or her Microsoft password. (Otherwise, you'll need a Microsoft account to authenticate yourself.)

As long as all parties have Office 2010 or later versions, real-time editing can take place: invited guests can add, edit, or delete content in a sort of collaborative free-for-all. That can be managed, however, by some fine-grained editing restrictions, such as locking format changes, restricting a user to making only tracked changes, or by blocking him or her entirely (while letting other users make free, unrestricted edits). You can attach a comment to the document itself, or to a specific location in the text (which then shows up as an icon). You can also manually save whenever you'd like to create a version history that helps organise the document further. Even if you're offline, you can still monitor progress using Track Changes.

With PowerPoint, however, most of that goes out the window. You can ask coworkers to collaborate, and you can still send them links by which they can edit your shared presentations. You can still comment, and coworkers can still make changes to the text as they wish. But you can't really manage their changes, or restrict what they can or can't do. (You can compare and reconcile versions of the same document that a coworker has worked upon separately, however, which is vaguely similar.)

But – and this is a big but – any revisions to a document show up only if you click a tiny Save icon, way down at the bottom of the screen, that serves as a sort of CB-radio-style 'Over' command. It's almost impossible to find unless you know what you're looking for. Click it, and

changes made by others show up. When your colleague makes another change, you have to click it again.

Granted, collaborative editing wasn't in the Office 2016 preview Microsoft released earlier this year. And, given that there's an enormous blank space in the ribbon header to the right half of the screen, you have to imagine that more managed sharing is heading to PowerPoint. (Microsoft tells me it is, shortly.)

OneNote
Here's the news on OneNote: linked OneNote notes. The feature's actually been around since Office 2013, but it seems to be more prominently displayed under the Review tab of apps like Word.

A linked OneNote note can be a bit confusing. In a OneNote note, you can add a hypertext link to a web page that allows you to jump directly to that site. But what a linked OneNote note does is create a separate window pane that allows you to reference another document or web page as you're reviewing your notes.

In some sense, this duplicates your working environment. Imagine your boss discussing a proposal. With Linked Notes, you can open that document, link it to a note, then begin typing commentary. When you review those notes, OneNote knows that you were referring to the Word document and can bring it up. If your boss then moved on to a PowerPoint document, you can link that too: moving your focus as your boss shifts gears. (Excel isn't supported, yet.)

OneNote linking doesn't allow you to highlight a word or page of a document. It links to the document, which opens in a separate window,

not a pane. And, of course, it would be nice if the feature were ubiquitous across Office. But with markup, live collaboration, and OneNote linking, Office 2016 should make it easier to recall earlier meetings that have blurred together.

Outlook
Normally, Outlook would seem to pale compared to the leading lights of Office. At one time, email was both the medium and the metaphor for managing business relationships. Now, however, modern social networks threaten that model – and Microsoft has no answer to that. Nevertheless, Outlook remains the connective tissue for many of the Office apps, and now it's the hub of Microsoft's collaborative vision.

Microsoft has added a number of small conveniences to Outlook 2016. For one thing, if you want to add an attachment, Outlook pulls down a list of recently used and modified files across all of the Office applications. If you want to email an enormous file (say, 700MB) Outlook will email a link to the file stored in OneDrive, rather than clogging your network and mail folders by emailing the file itself.

Microsoft also added a more important addition, Clutter, a sort of second-level spam folder. Clutter, which has been available on the Outlook.com web app for months, takes work email it deems unnecessary (notices for a fun run; 'doughnuts in the break room' and the like) and puts them in a dedicated Clutter folder.

Clutter isn't perfect: it tries to determine what you want to save and what's irrelevant, but you'll tend to find some email you'd want to read in the Clutter folder. (You can turn it off entirely if you so choose.)

The flagship feature of Outlook 2016 is a new Groups feature, which carves out a portion of Outlook – and Office, to a lesser extent – into a series of small, flexible teams that you or a colleague can create. Instead of exchanging emails, the dynamic here is more conversational. But that's not all: Groups interacts with a web app that Microsoft calls the Planning Hub (sort of an online version of Trello) as well as its new app for surfacing enterprise content, Delve. So it probably makes the most sense to view them as a cohesive whole.

Outlook Groups, Office Planner, and Delve

There are more collaboration options: Outlook Groups, Office Planner, and Delve. If you're a typical Outlook user, your left rail in Outlook will already be full of various folders: Sent Items, Deleted Items, Important, and many more. At the bottom, Outlook now adds Groups.

Groups can represent an ad-hoc team formed to hammer out a feature request, an entire sales organisation, or anything in between. In previous versions of Office, you could create an email alias, such as 'West Coast Edit', that stood in for this. But with Groups, you can create a shared calendar and OneDrive, then track the progress of various group projects via the Planning Hub.

It's not immediately obvious how to form a Group. We right-clicked the Group label to form one. (An administrator can also take care of this for you.) Outlook asks you to create a group name, and at least in our organisation, assigned it its own email address. For now, much of this takes place at Outlook. com, in a web browser. Using it via Chrome gave us some problems, but Edge worked fine.

In general, we like Groups, if managed appropriately. Microsoft put some thought into how Groups messages are passed, allowing you to send in-Group email (known as Conversations) into your general Outlook inbox – or in its own workflow. Outlook already offers a number of ways to connect with contacts, via messaging Skype, email, or phone. Some people want to see all that communication in a single, unified interface; others want to break it out into discrete conversations. Groups allows you to do both.

As you and your teammates plan and move forward on your various projects, Delve and Outlook's Office Planner help manage the effort. Both are (or will be) web apps, available from the Office menu in the upper corner of Office365.com.

Delve is sort of an odd fusion of OneDrive and Lync. One portion of it is devoted to surfacing relevant documents that you know are buried somewhere in your Outlook folders, while the other will show you more information about a particular colleague, such as her CV and
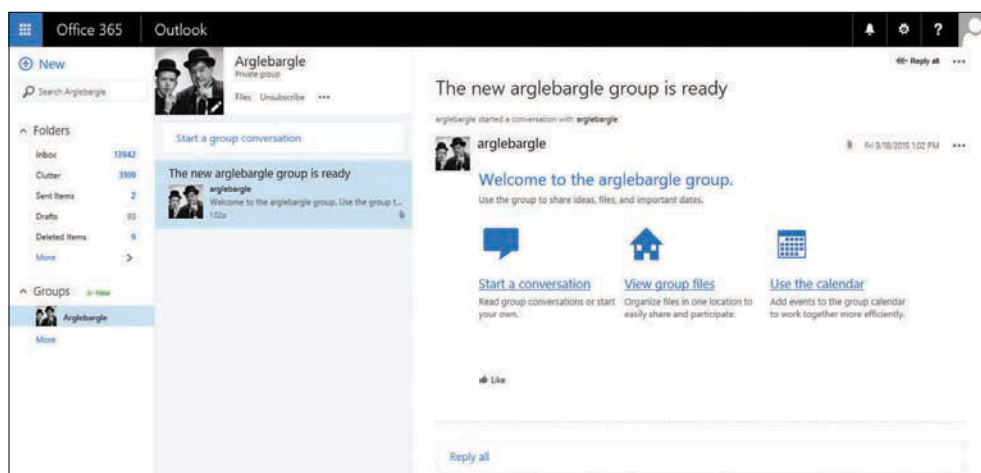
where she sits in the organisational hierarchy. (If you open a contact card in Outlook and view the SharePoint profile, it will open this Delve page.) We couldn't care less about where a colleague went to school. But in our own workflow, Delve automatically shows us the documents we use most frequently.

We're torn on Delve's usefulness. We think that there's a case to be made that if it needs to exist, then something in modern business (or in Office) is broken. Delve does find documents we need, and we like that, but it also displayed a flurry of test documents we had created and will never use again. Not so great. And we don't understand the concept of the standalone Delve mobile app – we can surface relevant documents, but we have to go to another app to contact people about them? Finally, Delve is also only good for finding attached documents – if a colleague dropped a critical bit of information into an email, you're out of luck.

Microsoft also showed us a web app that will ship a bit later: the Outlook Office Planner. Eventually, Office Planner will be one of the options that you can access from the 'waffle' menu in the upper righthand corner of Office365.com, along with web app versions of Outlook, Word, Excel, OneNote, Delve and more. In the preview build we were given, we had to navigate there from a fake email sent to our demo persona.

Office Planner is Microsoft's entry into simplified, collaborative project management. Its card-based format reminded us a bit of Trello, although the functionality is probably closer to Zoho Projects. Visually, it's a stunner. On our Surface, we were able to create

tasks, assign them to individuals to be due on a given date, and upload any files or links that would be relevant to the task at hand. We didn't see a way to file a given task to a superior, though, or to apply any sort of metrics as to how well it performed.

Office Planner does provide a bright, informative set of 'charts' that actually tracks the status of each project by task. Click on each category to drill down to the specific task at hand. A bar chart also allows you to see the number of tasks each individual has assigned to them, a nice way to ensure the available resources are used correctly. There doesn't seem to be any limit to the number of projects that can be managed at a given time, and Office Planner is free with Office 2016, versus the monthly fee other services charge.

It's not immediately apparent how you connect Office Planner with Outlook; as it turns out, adding a task in the Office Planner sends an email to Outlook with the assignment. And, of course, there's a complete lack of mobile app integration for Office Planner at the moment, a shortcoming Microsoft will have to quickly rectify to compete in this space.

Many of the other applications within Office integrate quite closely with Skype for Business, the app that essentially replaced Lync in 2014. Office Planner doesn't. In fact, there doesn't seem to be any way to connect with someone involved with a task except for email. Skype offers you a nice, clean interface to chat with a colleague, share files, and even share your screen (although this feature lagged a bit when we were chatting with Microsoft

This took me just a few minutes to create, and it looks great. But there's a formality to it, too. You'd probably still want to use Facebook or a social network to plan a lunch outing, while Groups works better in a business environment

representatives). In this sense, Office Planner feels unfinished.

Microsoft told us that it sees Office Planner and Groups as the avenues of private, intra-team conversation, and Yammer as the means to communicate hitting milestones to the rest of the company at large.

What worries us a bit, however, is that Groups seems to assume that one person equals one job. In a large organisation, that may be true. But some of the appeal of Groups is the ability to form a Group as one needs it. At a business employing 60 people, you could conceivably have a number of groups with different combinations of a handful of people, but focused on different tasks.

Formalising numerous, different interpersonal group relationships with shared calendars, emails and the like – and then trying to figure out what to do with them as time passes – well, it seems like it could all become very complex, very quickly. And that doesn't even begin to take into account permissions: whether an engineer will need to be granted the appropriate permissions to see sales data, or if partners can be invited in to assist with a marketing campaign.

Sway

We've previously dubbed Sway one of the first of a new generation of 'blended apps', lifting elements from Word, PowerPoint, and more and combining them in a way that feels interesting and fresh. Sway allows you to create a newsletter-esque layout that emphasises graphics, with photos used as backdrops and transitions sliding in to introduce new sections.

You create Sways in a layout or 'storyline' mode, where you embed text, images, videos, tweets, and charts in a card-based motif that's not altogether intuitive to someone used to laying out images and text in Word. It's sort of a WYSIWYG approach, as you can see the changes applying themselves to the 'final' document that's visible to the right on the screen. There's some noticeable lag, though, and we're not fans of the sliding transitions between the preview and storyline modes.

Fortunately, you don't have to think that much, as Sway itself selects what it thinks might be a
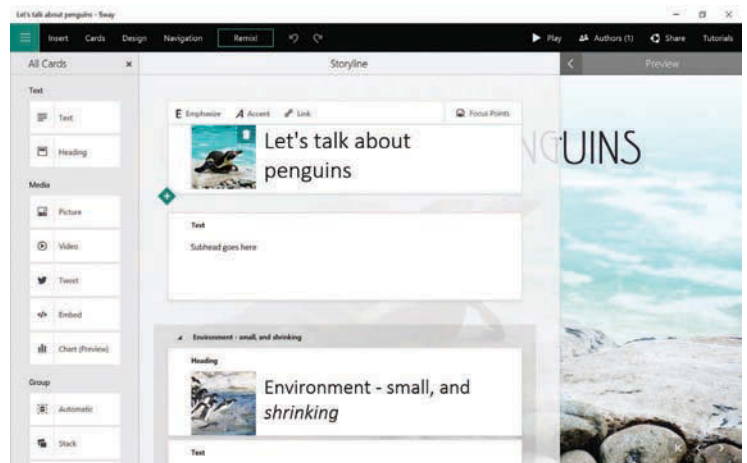
good font or colour scheme, even coordinating them to certain images. You can even select 'focus points' for a given piece of art, though we're not sure what that does, exactly. And if you don't like it, you click Remix, and Sway will select a new font and design on the fly. As someone who doesn't have a great eye for design, the additional suggestions were welcome.

Sway starts out simply enough: you pick a title and a backdrop image. Embedding an image is as easy as typing a search term in a box, then letting Bing or PicSay find a Creative Commons image for you. But if you want a subhead, or even a text box to put your name on the report, there's no obvious way of doing so.

Sway is designed for the modern Web, and sometimes it becomes a bit pretentious in that regard. We like Sway's autosave feature – in fact, you don't save Sway with a file name; it simply shows up as a presentation in My Sways. But when 'emphasise' stands in for 'bold face,' and 'accent' for 'italics', it's a bit over the top. Loading the index and individual Sways also takes several seconds, and that's annoying.

Sway seems geared at the education market, but it lacks a word-count feature – one metric most teachers use. We'd also add a legacy 'print mode' to allow students to hand in a physical copy of a Sway. Otherwise, Sway is a creative use of Microsoft's development efforts.

Increasingly minor apps

Sway may be one of Microsoft's first blended apps, but Publisher really feels like a subset of Word, not an app worth reserving for Office 365. Publisher's territory is being

encroached on, anyway. If you want to produce a flyer or business cards, Publisher's your app. There's even a template for a baby photo album. But you can see that all of these products could be made in Word, or via a web app or online service.

The Access database app is to Excel as Publisher is to Word – a corollary app that we're sure some people feel strongly about, yet nobody seems to use. Case in point: this unanswered Microsoft support thread, asking about what's new in Access 2016 – with all of seven people chiming in. Access has the look and feel of the other Office 2016 apps, but that's about all.

We're sure there are a number of people who can speak knowingly about how databases are more useful than a spreadsheet, but Microsoft seems to have put all of its effort into improving Excel. We were also a little concerned about this error message, which we discovered on checking a Microsoft-authored template for version information. After all, isn't the point of Office 2016 to use live, active content?

Office Mobile, web apps

Office 2016 has another problem: the Office Mobile apps. Free, ubiquitous and simple to use, it's often worth loading up the Excel, OneNote, PowerPoint and Word Mobile apps first, then dropping into Office 2016 only if necessary. After all, if your document is saved to OneDrive, you can easily pull it up in Word Mobile as well as Word 2016.

Granted, you're not going to find much of the nuance and complexity
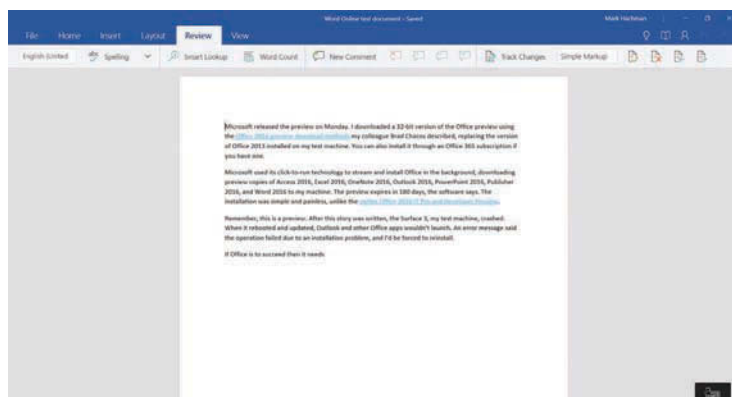
The Office Mobile apps don't have as much to offer as Office 2016. But there's a lot there for the casual user, too

found in the paid Office apps. But for our own use, we prefer using Excel Mobile to Excel 2016, precisely because our needs are basic. Summing a column is performed automatically, for example. In Word Mobile, we can track changes, check spelling, add footnotes, and even perform the Smart Lookup function built into the paid version of Word.

If you'd like, you can also visit Office.com and try out some of the web-based versions of Office. Yes, it's another version of Office, and largely redundant, too. But the web apps will be one of the first platforms to receive new features, precisely because they can be updated on the fly. Features such as Clutter, which we really like, debuted on the web months before the dedicated apps. The same goes for saving documents into Dropbox: you can do that via the web apps, and even Office for iOS and Android, but not Office 2016, yet.

You do make a sacrifice or two in choosing the built-in Office Mobile apps. You can only work on one document at a time. The real-time collaboration Microsoft boasts about? Not there, although you can still track changes as before. OneNote Mobile also lacks one of our favorite features: voice recording. More and more features have trickled down to the free versions, but there's still value in paying for the full Office suite.

What makes it great?

If you've skimmed through this review, we bet that you focused on just a section or two, because

you don't use all of Office to its full capabilities. Office has become siloed: writers use Word religiously, while number crunchers plumb the depths of Excel. Sales and marketing gurus live in PowerPoint. A generalist might be able to produce a basic spreadsheet, but stop short of fancier techniques, such as pulling in live, disparate data sources to support a proposal.

The future of Office 365, then, depends on compelling as many potential Office customers as it can to say: "I didn't even know it could do that." Alas, Office 2016 barely accomplishes that goal.

We can tell you what's new in Office 2016 – and if you look closely enough, you can notice many of the new features yourself. But what are they? And what are they good for? These are two questions Microsoft simply assumes you already understand, and that's a dangerous assumption to hang a multi-billion-dollar business upon.

Microsoft would love for you to subscribe to Office 365, and the company promises a steady stream of monthly improvements to keep you hooked. But what are they? Office 2013 never told you. You'll have to dig out Office 365's upcoming feature road map to find out. Office 365 Home allows you a license to install on five devices, five tablets, and five phones, plus a terabyte of free storage. But it's been almost a year since Microsoft promised unlimited OneDrive storage, and it still hasn't happened.

Office 2016 continues to leave you in the dark about what it's adding, although a slightly tweaked dashboard will apparently serve to introduce you to Office's improvements. But Microsoft needs to sell Office to you, rather than simply assume you'll buy it. How? By educating the user on how to

use Office. Office 2013 and 2016 do a nice job of explaining what random menu items actually do via tool tips: in Word 2016, for example, you can hover over Theme fonts, for example, and be told "This is an easy way to change all of your text at once. For this to work, your text must be formatted using the 'body' and 'heading' fonts." Then there's a 'tell me more' link that provides a fuller explanation, using text and graphics, on how to change theme colours, create your own, and so on. It's just a help file, but a pretty good one.

We think that Microsoft needs to take the next step, though, and start showing, rather than telling, how users can use these features to best effect. The obvious tool, of course, is video. In any event, we'd like to see a list of document templates when we open Word – but also a video tutorial on how to create our own.

If Office is now online and connected, take advantage of it. Let us open up Word and see a list of videos next to those templates. Microsoft has a stable of how-to videos, but very little education on how to use the features they describe. Show us how, but also why to use Office. Put those videos in Word itself, showcasing what's live and useful. Connect those videos to the tool tips. Consider embedding a live video thumbnail in the app itself.

You begin to see this verve, this liveliness, in Delve and Sway. Documents breathe. But in the stock apps – Excel, PowerPoint, Word– that legacy feels like a boat anchor. Office is 27 years old, people, and it still feels that way.

Verdict

We're reluctant to advise you to rush out and buy Office 2016. Windows 10 offers a number of capabilities, and for free. That makes it a no-brainer. Microsoft wants you to buy Office 2016, and the company already provides a suite of free Office Mobile apps that doesn't make that decision easy for casual users.

Buying Office 2016 means investing in collaboration, and subscribing to Office 365 means insuring yourself for the future. If both of these appeal to you, then get out your credit cards. If not, then you might try Microsoft's free alternative, Office Mobile.
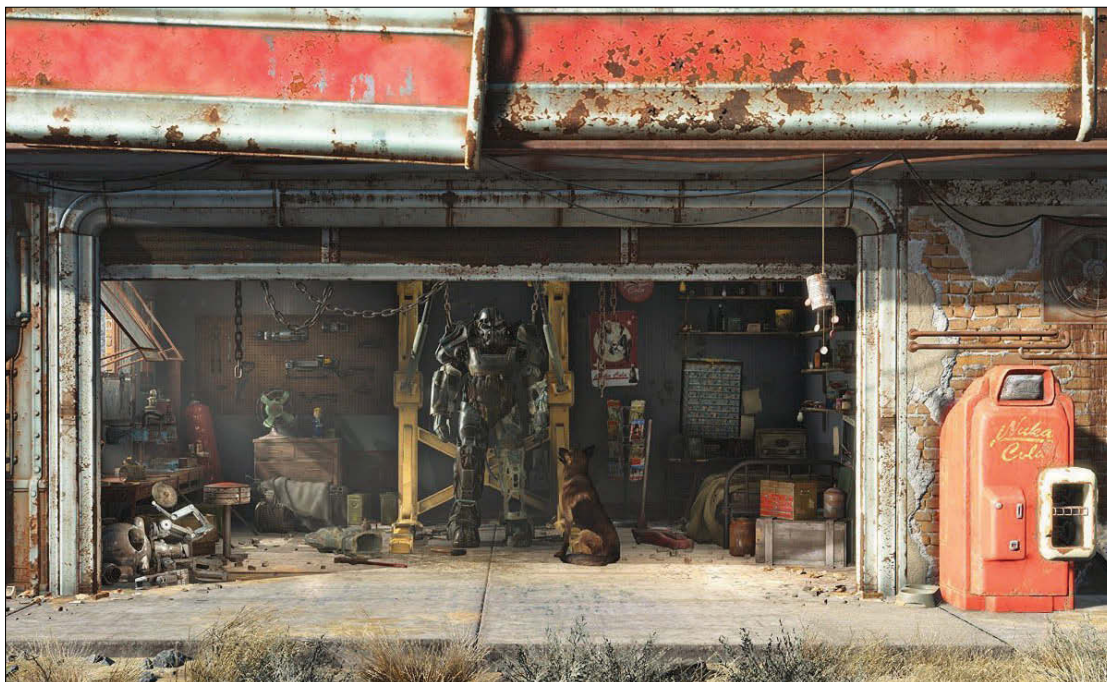⊠ **Mark Hachman**

£35 inc VAT

Contact
■ fallout4.com

System requirements
PC; Sony PlayStation 4;
Microsoft Xbox One

★★★½☆

Fallout 4

If you want to know what Fallout 4 gets right, look no further than its predecessor. Or any Bethesda game, really, but Fallout 3 is the most pertinent. As you emerge from Vault 111 for the first time, momentarily blinded by the harsh sunlight and clad in familiar blue-and-yellow jumpsuit, there's that familiar sense of possibility. You check the map, walk for a minute, check the map again, and then you estimate how long it would take to walk across the whole thing.

It's an intoxicating feeling, and makes up for a burdensome main story. Fallout 4 has some interesting ideas, but it's mostly a convoluted mess. There's a chance, if you join more than one of the game's factions, that you'll find yourself on missions where everyone is shooting everyone – except you. For some reason they all assume you're on their side, playing double- and even triple-agent. Even if you're in the process of explicitly betraying one group. This isn't a one-time thing. It happens repeatedly.

Fallout's slice of 1950s suburbia is more than just a backdrop – it's a character. It tells you stories, if you're paying attention, such as two skeletons, holding hands on a bed with a 10mm pistol lying between, or office memos and earnings reports that, when pieced together, form a compelling thriller about surreptitious backroom dealings and corporate espionage. You basically play a post-apocalyptic archaeologist, who is trying to piece together an idea of who must have lived there, before the bombs fell, while Bing Crosby croons at you in the background.

Huge world to explore

Although Fallout 4 is much bigger game than its predecessor that doesn't make it better. In Fallout 3 there are around 150 named locations in the entire game, most separated by expanses of wilderness. And nearly every location (minus the subways) existed for some reason, be it a quest or a unique piece of loot. In Fallout 4, however, only around half of the locales have some sort of interesting facet to them. The rest are repetitive combat arenas and glorified post-apocalyptic spelunking.

We could direct blame at a number of new features. The sheer scale of the game, for example. It's big and padded with 'Content', meaning a lot of locations seem to exist just to exist – to let you shoot a few more ghouls and pick up some hair pins and other extras.

But that points to another issue: the lack of unique loot. There are very few unique weapons in Fallout 4 – after nearly 10 hours of play we found a grand total of five. Even boss enemies, who you'd expect to have a unique weapon or armour, often reward you with trash items.

This was done, we suppose, to convince players to use the new Crafting system. Found a totally boring, generic 10mm pistol? Now you can break down all the trash items in the game into components, which allows you to add a scope, a larger magazine or what-have-you on to basic weapons. And then you can name it and make your own custom weapon.

There are some unique pieces of gear in the game, but far less than before, and as a result there are entire locations in Fallout 4 that exist solely to replenish your supplies of RadAway and Stimpaks.

Crafting also has the unintended consequence of forcing you to use the same weapons and armour.

This then is Fallout 4 – a bunch of systems that seem interesting at the beginning, but kill the experience stretched over 100 hours. You'll take over Settlements, for instance. These are custom bases of operation, where you can put on your carpenter hat and build new houses, furniture, fences, and so on. Initially, we spent an hour early on in the game building a fence around our first settlement. But then Fallout 4 unlocked two settlements. Then three. Then a dozen. And with each unlock, we became less and less

interested in making sure everything looked good. It would have been far more interesting to have one settlement to put all your resources and work into. Unfortunately, this isn't the case. There are a bunch, and each will periodically come under attack and expect you to come help defend. Something that soon becomes tedious.

We also had a problem with the Power Armour. In an effort to make you understand that it's important Bethesda has changed the way it works. You no longer wear it perpetually. Instead, it now acts almost like a vehicle – one you need to periodically refuel with a rare item, called a Fusion Core. This resulted in us not wearing it because it was more trouble than it's worth.

Bugs

We should talk about the game's bugs. Here's a list of those we've encountered after 100 hours of play.

1. Accessing the Power Armour from the front sometimes resulted in our character trying to walk through the suit, locking all the controls and forcing a reload. We found that using Terminals with chairs in front sometimes had the same result.
2. Late in the game, trying to fast travel to Ticonderoga causes the game to crash.
3. Companions aren't much help. We travelled with a gentleman by the name of Nick Valentine, who would sit down whenever we were busy and then not get up again. Companions will also try to walk through walls, run in the opposite direction when you get in an elevator, fall through the floor because they can't jump, and so.
4. On the plus side, you can walk away from any conversation. You're no longer frozen in place. Unfortunately, neither are NPCs. Sometimes you'll be having a serious talk and characters will just turn around and walk away from you, forcing you to start the whole conversation again.
5. We had three different quests where the scripting broke. Two of them we were able to fix by fast-travelling away and then back, forcing the game to reload the quest triggers.
6. The game wouldn't even launch to the menu on our laptop in full-screen mode, Low settings,

but ran fine on a mix of Medium/ High in borderless windowed.
7. Not really a bug, but the menus in this game are a mess. Sometimes Escape is used to exit menus (like the workshop), while at others it's used to pause the game. Indeed, keyboard and mouse controls are shaky across the board.

These are only the major bugs we encountered. There are innumerable graphical and audio glitches that also plague the game, plus major optimization issues. And the load times are also predictably lengthy and obtrusive. If Bethesda releases a patch that eradicates some of the more egregious of these, add another half-star to our score. It's that buggy.

Verdict

For a long time, nobody made games like Bethesda. There is a leniency afforded to you when you're the only one doing something that people like. You overlook the bugs, the bad AI and the poor main story. Now, however, other studios are creating better open-world games. However, despite our complaints, we enjoyed Fallout 4. The setting is its strongest asset, and if post-apocalyptic Boston is less iconic than Washington DC, it at least makes up for that fact by being an important locale in Fallout lore. This isn't the step forward we expected, though. Here we are, the first Bethesda game on a new hardware generation, and it fails to address the problems of previous offerings. ⊠ **Hayden Dingman**
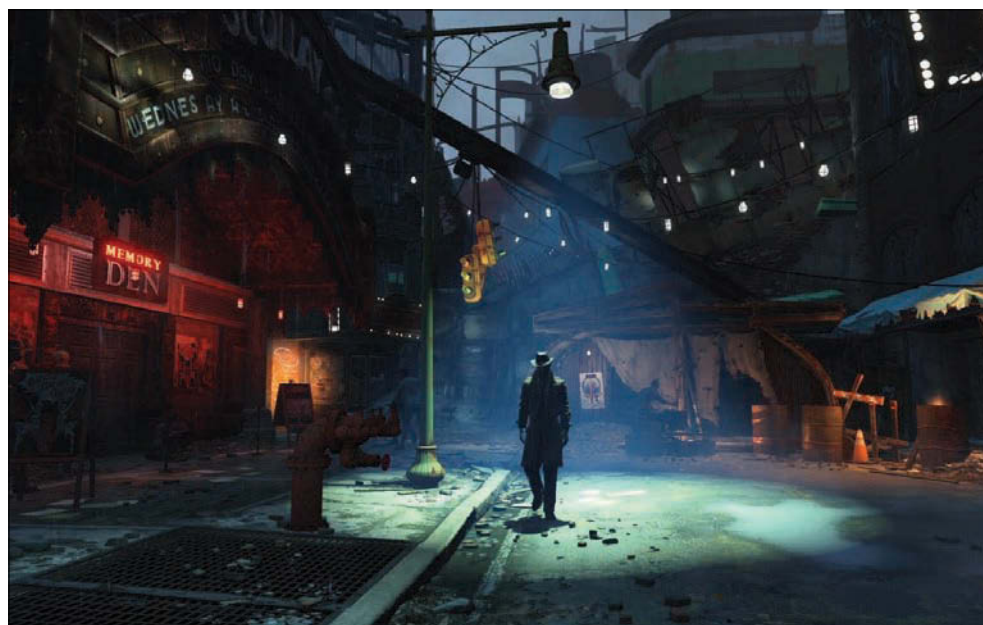
GAME

Star Wars Battlefront

We've largely come to terms with Star Wars Battlefront. It's not like Battlefront II, but it's not what we wanted from Battlefront III either.

So what is it? Well, it looks great, for one, and it sounds good, too. Neither of those facts should surprise you at this point. It was developed by DICE, and this is what it does. Battlefield has always been (at least audio-visually) a technological marvel, and that talent makes it over intact to Battlefront.

Whether you are tromping through the glistening snow of Hoth or the sun-dappled redwoods of Endor, Battlefront looks and sounds

like Star Wars, to an incredible degree. Red and green laser beams fire through the air, and old-school sparks erupt wherever they hit. AT-ATs awkwardly shuffle back and forth around the battlefield. And perhaps most delightful of all is the Wilhelm scream you'll occasionally hear from a fallen foe. Indeed, in many ways, Battlefront feels even more faithful to the look and feel of the original Star Wars trilogy than George Lucas's green screen-heavy prequel films.

At its best, this is your lovingly-detailed toy box brought to life – Darth Vader and *Return of the*

Jedi-era Luke Skywalker striding out into the middle of Hoth for a climactic engagement, while Y-Wings strafe overhead and an Imperial Star Destroyer bombards the ground from its lofty perch in space.

Lack of substance

Unfortunately, the game itself is surprisingly thin. Just three modes feature large-scale conflict: Walker Assault, Supremacy and Fighter Squadron. These allow for the full 20 versus 20 battles, vehicles and hero units.

Other modes include Death Match, Drop Zone and Hero Hunt. These make for a fun break from the bigger modes but they're light on spectacle and none feels like something you'd sink an afternoon into. Especially since, as a shooter, Battlefront has some nasty issues, including awful spawns (especially on Hoth), grenade spam, and overpowered one-shot weapons on extremely short cool downs.

So you end up returning to the larger game types and the 12 maps. They are beautiful and four of them are enormous – the remaining eight are smaller. With EA selling its usual £40 season pass with (we assume) more maps, the whole thing feels cynical at best.

And let's return to the fact the game is limited to 20 versus 20 even in its largest modes. DICE does a good job disguising this, mostly by clever use of sight lines

and choke points. It's easy to get sucked into 10-person battles and feel a sense of larger scale.

Wander a bit, though, and you'll soon realise otherwise. These maps are, as we said, enormous, yet large parts of them is empty. Leave wherever the latest pitched battle is occurring and you'll find that no-one else is around. Nobody explores the side corridors and no fighting takes place 100m behind you. It's all focused on the choke point, because DICE has led players right to it.

We suspect this is why there's no Conquest mode. Instead, Battlefront has Supremacy, which is similar on the surface, but plays out in a fundamentally different way. Conquest allows for the freeform capture of a certain number of objectives. Supremacy has five objectives, but at any given time your team will attempt to capture one and defend another, proceeding in a linear fashion.

This keeps the battles tight and centred around certain areas, but it makes us wish DICE had borrowed from its EA cohort Respawn. We don't think Titanfall's bots were a great solution, but at least they fleshed out the action.

The result is that Battlefront 2015 feels both bigger and smaller than the 10-year-old Battlefront II. Sure, put the two next to each other and the difference in graphics is clear. A decade ago, Battlefront II's sense of scale is what tricked us into feeling we were living Star Wars. DICE gets pretty close to the same feeling with some spectacular graphics, but it's not enough. Not for us, anyway. It's definitely not where we expected we'd be in 2015.

Single player

There are also two single-player/co-op modes. One is a reskinned Horde option, fighting off waves of enemies. The other is basically the same thing except the waves are just a stream of troops and you're aiming to kill a certain amount. We don't think either is interesting, though it will let you use all weapons immediately, no unlocks necessary. We played through each mode once and then went back to multiplayer.

Verdict

It's admittedly hard to divorce our opinions of Battlefront from our expectations – both in regards to the game's predecessors and DICE's other work. We've tried to avoid too many comparisons to Battlefront II here, but we've waited a decade for this game and after 10 years this is not only missing many of the modes and features that seemed destined for Pandemic's original stab at a Battlefront III, but also much of what we liked about Battlefront II.
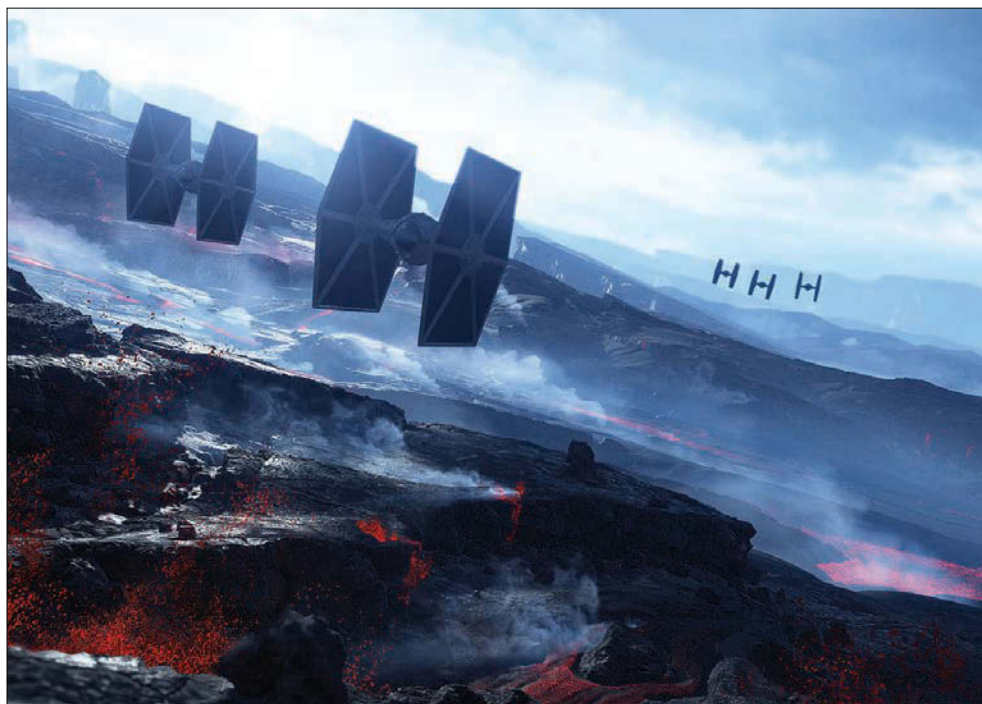
We've also tried to avoid harping too much on 'problems' that are endemic to the source material. For instance, we're still not fans of the fact the guns in Battlefront have a spread instead of recoil, and we don't like the feel. That, however, is what laser rifles (at least in Star Wars) do, and DICE couldn't change this even if it wanted to, and we've come to accept it for what it is.

But we think the game falls into a weird place. It's not Battlefront III enough for the diehard fans, and it's not deep enough (at least, not without spending another £40 and waiting on a long dribble of content) for us to believe the game has staying power. It is, however, friendly enough for beginners that it may (temporarily) appeal to the masses of Star Wars fans that have never touched its predecessor or a modern shooter, but want to pick up a fun video game after seeing *The Force Awakens*. ⊠ Hayden Dingman

GAME

Life is Strange

★★★★☆
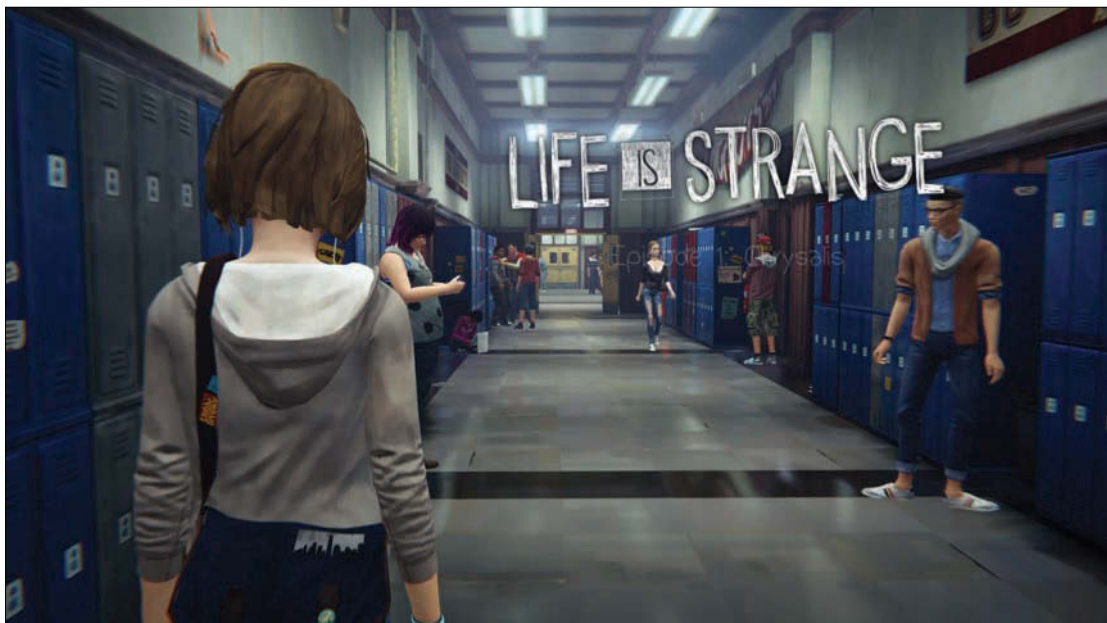
When Telltale first released The Walking Dead, we thought that the dialogue and/or choice-driven stories worked pretty well when the stakes were life-and-death, but didn't think that it would be nearly as compelling without the threat of the apocalypse.

Life is Strange is the game that tries to prove us wrong. You play as Maxine 'Max' Caulfield, a teenage girl at the prestigious Blackwell Academy – a private boarding school in a small town, Arcadia Bay.

The game draws its inspiration from Telltale's style of adventure game – half the game is walking around and listening to Max comment on her surroundings, while the other part is made up of lengthy choice-ridden dialogue sequences, complete with its own 'That Was An Important Decision' indicator.

And for the most part, you're a teenage girl with teenage problems. Bullies. Suicide. Overbearing parents. Absent parents. Trying to figure out how to stand up for what you believe in. Trying to work out what you believe in. Navigating cliques and drama. Hanging out with your best friend Chloe.

There's a level of artifice to it – a feeling, sometimes, of "Do kids actually talk like this?" And the subsequent "No, no they don't." It's not so much an accurate appraisal of teenage-dom as it is someone's earnest recollection of what it felt like to be a teenager.

But the ideas are real. If Life is Strange doesn't completely capture its subject matter, it at least hits on truth enough of the time. Feelings of insecurity and of playing at adulthood, are powerful and not often explored in video games, given our tendency towards trying to escape those feelings through supercharged power fantasies.

Life is Strange has its flaws. The game's use of slang is particularly questionable, and sometimes cringe-inducing. And the cast is maybe six or seven characters too large, with a few who do nothing. It seems they exist simply to exist, or are dropped after a strong setup in the first two episodes.

We were surprised, though. Life is Strange makes the mundane compelling, episode after episode. Looking through old photographs, listening to Max talk about her childhood or comment on how she's outgrown bits of pop culture, or seeing how the smallest of actions can have big consequences. These are the game's strengths.

Back to the future

The irony is that these menial glimpses of 'real life' are the most compelling part of Life is Strange.

Moving through the five episodes, we simultaneously move further and further away from Max-as-teenager. The low-key character study of earlier episodes is steadily supplanted by two larger stories: Max's ability to rewind time and the disappearance of another Blackwell girl, Rachel Amber.

Max discovers that she is able to time travel early on and, to its credit, Life is Strange makes good use of it. Since this is a choice-driven game, you're given the ability to make a decision on how events play out, then rewind and see how the other option works out, then decide.

However, the time travel element in Life is Strange makes more sense as a game mechanic than as a plot device, as it doesn't hold up to scrutiny. Any rules about Max's ability are largely arbitrary, held to only until the moment the story calls for them to be broken. Plot holes abound. And the mystery of how and why Max was granted this ability are never properly addressed.

It's fortuitous that she got it when she did, though. Rachel Amber's disappearance is a near-constant presence in Arcadia Bay, with her face staring out from dozens of Missing Person posters. There's something wrong with Blackwell Academy, and Max dons her deerstalker cap to try and uncover the school's darkest secret.

Life is Strange doesn't pull its punches. There are some truly depraved moments in the story, the likes of which we'd expect more from Condemned than some twee game about high school kids. And what's worse: some of those moments are avoidable, if you make the

right choices. Knowing you caused something horrible is far worse than knowing it was destined to happen.

The denouement fizzles, though. Despite some incredible sequences, Episode Five is largely on-rails and nullifies many of the choices you've made throughout the earlier chapters. Numerous characters are relegated to supporting roles and aren't given a proper ending. And the villain? Life is Strange abandons its trademark subtlety and knack for writing morally ambiguous characters, turning the villain from a 'real' person into a caricature.

It's not that the game ends on a particularly bad note. It merely doesn't measure up to what came earlier – in part because it stops focusing on Max, the troubled teenager and starts focusing on Max, the video game character who needs to save the world. And the latter's not as interesting.

Verdict

After you finish an episode of Life is Strange, a bar of text crawls across the screen saying: "The next episode is out now." This seemed a bit redundant since we'd already obtained the whole game. But after completing Episode Five, the line changes to something along the lines of: "If any of these themes resonated, let us know."

It's clear that developer Dontnod understands that what makes Life is Strange special is Max and her experience as a teenager, along with those of the other kids in her life – their insecurities, private confessions, feelings of love and betrayal, and loneliness and murderous rage. It's a cacophony of emotion, a time where the days pass slowly and each is either the best day of your life or the end of the world. At least, that's Dontnod's idealized fiction of being a teenager.

The rest – the 'main story' – is forgettable. What we're left with is the smaller moments. Fond memories of Blackwell, of watering a plant or watching *Blade Runner* with a friend. Normality can be poignant. Low stakes can feel high, given the correct context. Escapism is optional. This is Life is Strange's legacy, regardless of whether it always followed through. ⊠ **Hayden Dingman**
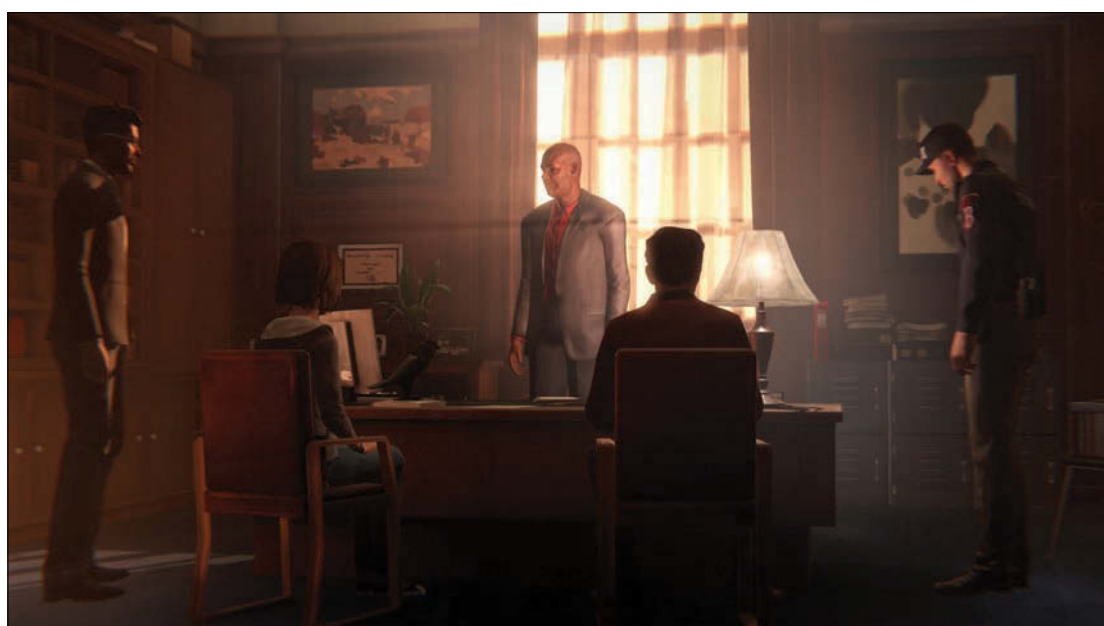
GAME

Transformers: Devastation

Despite the tagline 'Robots in disguise', subtlety isn't normally a word we associate with Transformers. And yet here we are – Transformers: Devastation is one of the most introspective games we've played all year, with the kind of quiet character development we associate with small, experimental indie games.

We're kidding, of course. Transformers: Devastation is a loud, unabashedly dumb brawler, full of the fist-pumping machismo that was a hallmark of the 1980s cartoon. It's a loving tribute where robots punch and shoot other robots for five hours, and then Optimus Prime says something overly melodramatic or Megatron laughs menacingly. And if you're a Transformers fan, chances are that's enough.

Roll out

On the surface, there's a lot working against Transformers: Devastation.

At just five hours, it's really short. Sure, you could replay the game with all five characters (Optimus Prime, Bumblebee, Sideswipe, Wheeljack and Grimlock) and theoretically extend the game to 25 hours, but we doubt you'll want to.

Why? Because the game is repetitive, even in just five hours. It's basically a three-minute loop: drive for 30 seconds, watch Optimus Prime mouth off for 30 seconds, beat the bolts out of some robots for two minutes, and repeat. Over and over, from one generic, artificial combat arena to another.

Not to mention the repetitive environments, the lack of depth to the combo system, the broken camera, the poor-to-nonexistent tutorials, the tacked-on (and largely useless) loot system. There are a lot of detractors.

And yet

We had a blast with Transformers: Devastation while it lasted. It is sheer spectacle, a toy box full of cell-shaded action figures smashing against each other with inhuman speed. It's that whomp-whomp-whomp noise you make when you transform from a speeding sports car into a robot and uppercut Megatron in his ugly face. It's the way Optimus Prime (voiced again by Peter Cullen) turns to the camera and says: "Autobots, transform and roll out."

This is the Christmas blockbuster of all Christmas blockbusters. The story is some nonsense about Cybertron, an ancient artefact and the Insecticons cyberforming Earth, but who cares. The bad guys are the bad guys because Optimus Prime says so, and that's fine with me.

It's a parade of fan service mixed in with some jaw-dropping set pieces, and that's (honestly) why it works. Is Transformers: Devastation a good game? Probably not. It is, as we said, very repetitive and shallow. Platinum's third-person combat is flashy as ever, but don't expect the same depth as Metal Gear Rising: Revengeance or Bayonetta. And

fighting generic fodder enemies soon becomes a bore, considering each seems to have some obnoxious gimmick that does nothing except force you to take them on in the same contrived way each time.

But you're not here for those bits. You're here for the boss battle against the colossal Devastator, or the multiple battles against Megatron or Soundwave.

This game is full of moments that are so over-the-top that they will leave you laughing. Unlike a lot of licensed games, there's obvious love put into Transformers: Devastation. Between the cell-shaded art style and the return of beloved voice actors, this is nothing less than a resurrection of the original cartoon.

Verdict

Transformers: Devastation is a decidedly B-tier (or even C-tier) game, elevated only because it's excellent at capitalising on its source material, and bringing everything it does right into the foreground, while shoving the rest to the sides.

That magician's act only works if you're a willing participant, though, and for that Transformers: Devastation relies on your nostalgia. There are better Transformers games on Steam – War for and Fall of Cybertron are both excellent. But Devastation captures a specific era, a 1980s rendition of Transformers that, for some people, is the only iteration that matters. This one's for them. ⊠ **Hayden Dingman**

4K ULTRA HD

With prices falling, now is a great time to pick up a 4K UHD TV. Steve May looks at six of the best

The 4K Ultra HD TV market is picking up speed. First generation sets, which proved less well future-proofed than a *Terminator* sequel, have given way to a mature new generation of 2160p screens that seem to tick every box. Sales are expected to top one million for the first time in the UK this year. Could the time be right to upgrade your HD flat screen?

The latest generation of 4K televisions combine 2160p resolution, that's four times the pixel density of Full HD, with forward-facing HDMI inputs that are able to handle incoming 4K content sources, such as Ultra HD Blu-ray and media streamers like the nVidia Shield and Amazon Fire 4K TV box. The key specification to look out for when it comes connectivity is a HDMI v2 input with HDCP 2.2 support. This new level of copy protection is being used by all external 4K sources, so the more inputs that sport it, the better. If you buy a budget 4K telly,

it most likely will only have one HDCP 2.2 compliant input. This could prove to be a bit of an Albatross when the content floodgates finally begin to open.

If you plan on using your new 4K screen with a home cinema receiver, that also needs to be HDCP 2.2 compliant. Upgrading a big home entertainment system could come with some significant additional costs, even if the screens themselves are getting cheaper.

While it's early days for native 4K programmes, both Netflix and Amazon are ramping up their selections, both in terms of TV shows and movies. Look out for 4K TVs boasting an integrated HEVC decoder, as this means the set will (most likely) support the 4K version of the Netflix and Amazon video apps. Of course, to enjoy streamed UHD you'll need a fast fibre broadband connection of 15Mb/s or more.

BT also offers pay TV subscribers UHD sport (football, Moto GP, Squash, to

Finlux 55UT3EC320S
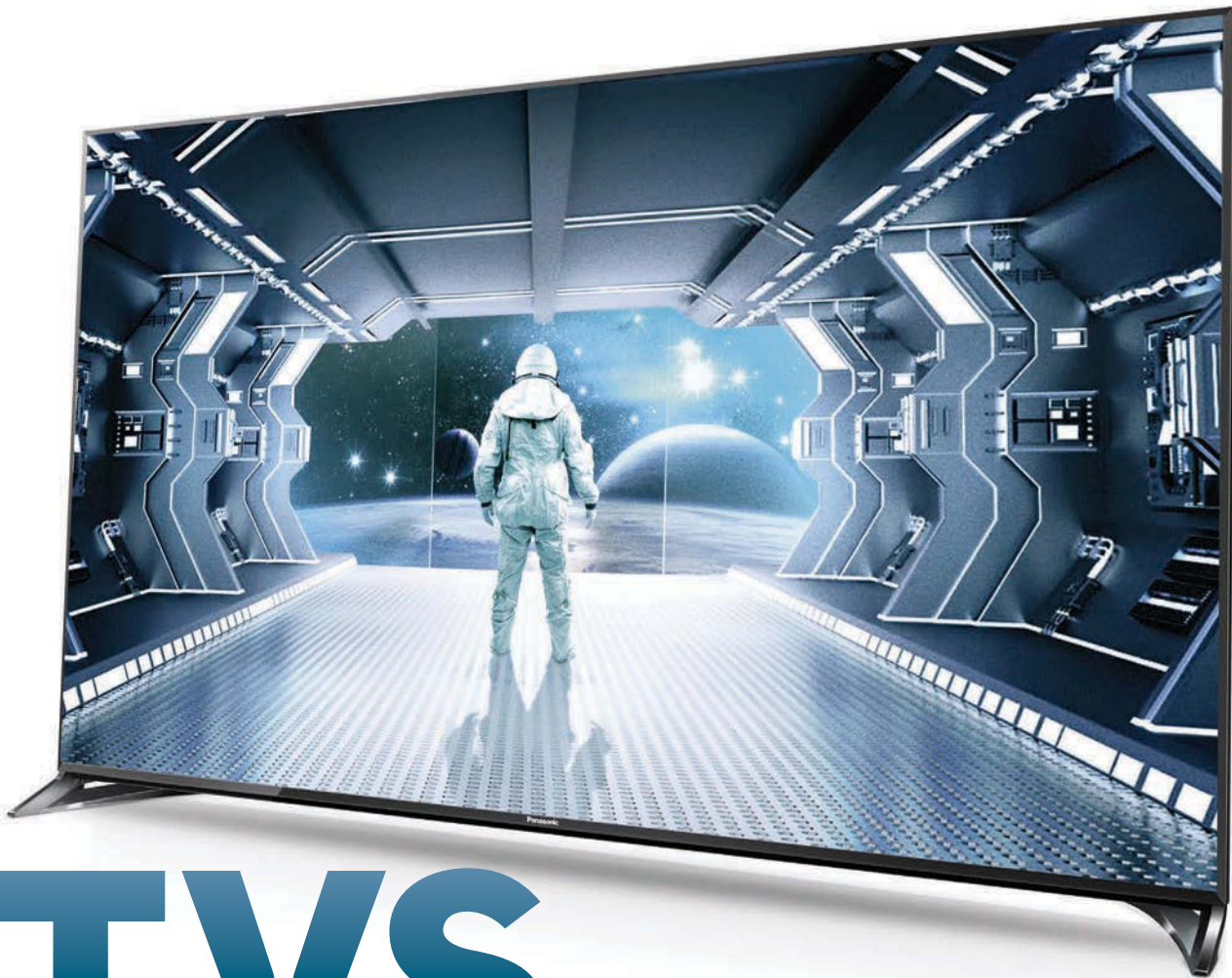
TVS

Panasonic TX-50CX802

name but three) via its Infinity broadband delivered Sports channel. Because this streams at 2160/50p a much faster broadband connection is required. BT will generally refuse to offer a set-top box to those Infinity customers on lesser than a 45Mb/s connection.

The price of 4K UHD TVs has fallen dramatically. Most are typically priced where HD models where just a few years ago. Manufacturers are transitioning all their larger sets to 4K resolution – so you'll probably end up with one even if it's not that important to you.

to see overt picture improvements from typical viewing distances.

The general rule when buying a 4K set is go larger than your HD screen and view at the same distance, or sit closer. Or do both. 4K scales really large without revealing a pixel grid, so it's comfortable to view up close.

It's worth remembering, though, that the 4K UHD specification is an ever-evolving feast. Unlike previous leaps in TV quality (black and white to colour, SD to HD), it's not intended to launch fully formed. Hence a rolling calendar of Phased updates that will continue past 2020, maxing out with 8K resolutions screens. Coming in 2016 will be a new generation of HDR (High Dynamic Range) UHD TVs, which offer higher peak whites and better colour depth than what we have now, with select HDR content. Some 2015 models claim HDR compatibility now, but until software actually appears their value remains untested.

> **Most 4K UHD TVs are typically priced where HD models where just a few years ago. Manufacturers are transitioning all their larger sets to 4K resolution – so you'll probably end up with one even if it's not that important to you**

Expect 4K content options to increase further in 2016 as the 2160p version of Blu-ray launches – the first player from Samsung is due in the spring – and Sky will also join the party soon with a new 4K capable receiver.

While the extra resolution that 4K offers is best appreciated on a large screen (55 inches plus), that hasn't stopped smaller panels appearing. While there's no reason not to buy a 4K TV at 40 inches, and the performance can be excellent, don't expect

FINLUX 55UX3EC320S

£799 inc VAT • finlux.co.uk

Build	★★★½☆
Features	★★★★☆
Performance	★★★½☆
Value	★★★½☆
Overall	★★★½☆

Best-known for its low cost 1080p tellies, Finlux has upscaled its offerings to 2160p, in both flat and curved styles. The model here is curved, although it's really not as svelte as you might expect. Viewed front-on it's smart enough though, with a thin bezel and seamless metallic trim. The set ships with a substantial chromed stand. The set is manufactured by European OEM giant Vestel.

Connectivity includes four HDMIs, all of which are HDCP 2.2 4K compliant. This means you'll be able to connect a variety of 4K content sources, such as the Amazon Fire TV box, Sky 4K set top box or Ultra HD Blu-ray. This means you'll be limited when connecting 4K content sources, such as the Amazon Fire TV box, Sky 4K set-top box or Ultra HD Blu-ray. Other inputs include an analogue AV input for SCART (adaptor supplied), component video and phono stereo digital optical audio output and subwoofer output. There's also a trio of USB ports, PC VGA input and ethernet LAN. Integrated Wi-Fi is dual band, so you can get connected either at 2.4- or 5GHz. The TV features a single DVB Freeview HD tuner.

Although Smart connected, the Finlux Smart platform is very first generation. Apps include BBC iPlayer, Netflix, YouTube, plus BBC News and Sport, Flickr and Dailymotion. There's more secondary stuff, but the display lacks other key catch-up TV services. There's an onboard HEVC decoder, so the Netflix app is 4K. As yet there's no Amazon 4K, but discussions are ongoing.

The onboard media browser is good. The set will play content from any DLNA connected device, be it a NAS media server of PC, as well as local USB. The set found our networked Plex and Twonky Media

servers, playing VOB files, AVIs, MKVs, MOVs, WMV, WMA, AAC and MP3s. However, it turned a deaf ear to FLAC music files.

Picture quality is better than you might expect. HD sources look crisp and smooth, while colours are vibrant. This set looks great with big explosions and luminous cinematography.

In addition to all the usual image tweaks – Contrast, Brightness, Sharpness and Colour – there's image interpolation as well as Dynamic Contrast. The Movie Sense mode is used to retain detail during fast motion when set High. However for most content, opt for Low, which reduces motion artefacts. The TV struggles to deliver a deep black, which can detract from its depth. The edge-backlight is a little uneven, too. The panel really shines with 4K content, though. Using a Fire TV box as a source, Netflix's period drama *Marco Polo* looked positively epic in terms of detail and nuance.

The onboard sound system is solid. The TV employs a pair of downward-firing speakers, but has volume and presence. The set is Active Shutter 3D capable, with two pairs of specs provided in the box. While there is some double imaging crosstalk evident, this isn't particularly bad.

VERDICT: Overall, the Finlux is a reasonable big-screen proposition. While not a great connected bet, image quality is decent. We really aren't convinced by the curved screen, though. This adds little to the viewing experience, beyond some rather warped looking reflections and wonky-looking programme guides. That said, off-angle viewing is rather good, with little loss of contrast and colour.

PANASONIC TX-50CX802

£1,299 inc VAT • panasonic.com/uk

Build ★★★★☆
Features ★★★★★
Performance ★★★★★
Value ★★★★½
Overall ★★★★½

PC ADVISOR
BEST BUY

It's taken Panasonic a few attempts, but with its CX802 range, the brand has pretty much delivered an irresistible 4K TV. Stylish, well specified and at a price that doesn't seem an overly risky investment, it merits serious short-listing. The screen comes in four variants. The version reviewed here is the 50in TX-50CX802, but it's also available in 40-, 55- and 65in screens sizes.

Build quality is excellent. Just 46mm thin, the panel is framed by a metallic bezel with a stylish chamfered edge. A half-moon pedestal stand leaves only two chromed feet visible.

The set features just three HDMI inputs, but all support HDCP 2.2. There's also a trio of USB ports, SCART and component AV for legacy kit, ethernet LAN, a digital optical audio output and SD card slot. Dual-band Wi-Fi is integrated. The set comes with two remote controllers: one IR, the other a Bluetooth trackpad. The Panasonic has both Freesat and Freeview tuners, offering both Freesat freetime and Freeview Play roll-back programme EPGs.

In addition, the CX802 also has the new Firefox OS, which is a minimalistic joy to use. An Info Frame offers viewing recommendations, notifications, weather and web clips, accessible by the direction key. Just press for the Info Bar, and it slides into view. Key apps include Netflix, Amazon Prime and YouTube, plus catch-up from all four main broadcasters. Both Netflix and Amazon apps are 4K capable, confirming the presence of an HEVC decoder.

2160p image quality is outstanding. There's a richness to its images that's lacking on cheaper sets. High contrast, superbly nuanced colours and voluminous detail make streamed 4K look outstanding.

At the heart of the TX-50CX802B is Panasonic's 4K Studio Master Processing chip shop. Pictures are detailed and dynamic, while the screen's black level is performance class leading. Often a failing of edge-lit screens, but here made a strength, backlight uniformity is high.

The usual picture presets are bolstered by a variety of THX modes for dark room movie watching. However, these don't always work well in the average living room. THX Bright Room is a good compromise, but Normal is generally the best all-round option. IFC (Intelligent Frame Creation) is best kept on its minimum setting. The screen is also reputedly firmware upgradable to support HDR (High Dynamic Range) content, which will be available on Ultra HD Blu-ray discs.

If the set does has a weakness it's in its limited backlight control. The Dynamic Backlight adjustment is crude, causing bright halos around light sources in dark scenes.

The screen does a fabulous job upscaling Full HD, particularly Blu-ray, to 4K UHD. The set is Active Shutter 3D capable, and performs well. *Tangled* (Blu-ray) reveals some crosstalk double imaging, but the presentation is engrossing. Given that this set has a largely hidden sound system, performance is good. There's certainly enough volume (40W) to hold your attention.

VERDICT: Overall, we rate the TX-50CX802 a superior 4K panel that is both fun to live with (Firefox rivals LG's webOS for stylish simplicity), while combined Netflix/Amazon UHD app support offers up a surprising amount of 4K content. The set looks great with both UHD and upscaled HD. This is one of the best 4K Ultra HD TVs of the year.

Build	★★★☆☆
Features	★★★★☆
Performance	★★★★☆
Value	★★★★☆
Overall	★★★★☆

PHILIPS 40PUT6400

£449 inc VAT • philips.co.uk

This budget UHD set may lack Philips' trademark Ambilight mood lighting, but it's still bright enough to warrant close attention. The first of the company's Android-powered connected TVs, it's a smart-looking flat screen, with much to commend it.

Cosmetics are neat and tidy, with a thin black bezel and wire frame pedestal stand. An illuminated logo pouts from the bottom of the panel; thankfully brightness can be moderated or switched off.

The set's connections include four HDMI inputs, though only one supports HDCP 2.2 copy protection, required for 4K content sources. There are also three USB ports, ethernet, SCART and component, plus a digital optical audio output. Integrated Wi-Fi is dual band, there's also Wi-Fi Direct.

The Android interface here is better managed than we've seen from Sony's Android offerings. The platform's baffling system settings and interface controls are buried away in the main Settings menu, resulting in a cleaner, more inclusive, Android user experience. The set supports Google Cast, offering a reasonable level of interaction with compatible mobile apps.

Onboard apps include YouTube, Netflix, iPlayer, Dailymotion and some lesser content options. Beyond the BBC, there's no catch-up provision. You do, however, get a wide selection of casual games. 8GB of local storage is provided, although this can be extended if you really need it. The set has an integrated HEVC decoder, and as a result has a 4K Netflix client. Spotify Connect is also provided.

For a relatively budget set, this 6 Series model offers a high level of image control and personalisation – gamma, dynamic control,

noise reduction. Most users will elect to stay with the presets, which comprise Personal, Vivid, Natural, Standard, Movie, Photo, plus ISF Day and Night modes. Philips image-processing tricks include a UHD iteration of its Pixel Plus image engine, with Philips Natural Motion.

Similarly, there are a large number of audio parameters, including Incredible Sound – billed as a surround mode. There's also support for additional Bluetooth wireless speakers. Media playback from USB and across a network is excellent. The TV instantly identifies DLNA sources and will play all popular video formats, including MKV. Audio support covers FLAC, AAC, MP3, WMA and WAV.

The picture quality is impressive. The set looks sharp and that UHD panel eliminates any sense of a pixel grit. Backlight uniformity is good. Micro Dimming Pro works with an on-set light sensor to enhance contrast and ensure blacks remain on the right side of dramatic. HD sources also look extremely crisp and cinematic. Colour fidelity could be better – the set displays deep reds as orange. While Freeview HD channels are sharp enough, there's no doubt Blu-ray and 4K Netflix look better. *Marco Polo* (Netflix 4K) has an abundance of detail, with lush textures and finely delineated fabrics, which convey well on this display. Unfortunately, audio, despite all its parameter control, remains thin. You'll want to add a sound bar.

VERDICT: Overall, this Philips is solid value. It's a good advert for Android and image quality is great. Despite the relatively small screen size, there are benefits to having 4K resolution on a 40in panel, though you need to get close to the screen to appreciate it.

PC ADVISOR TEST CENTRE

POLAROID P55D600

£699 inc VAT • polaroidhdtv.com

Features	★★★☆☆
Performance	★★★½☆
Value	★★★★½☆
Overall	★★★½☆

A favoured brand by TV bargain hunters, Polaroid has stepped up a level with its first cut-price UHD offerings, led by the 55in P55D600 reviewed here. If you need more screen space, you can also buy a 65in version, the P65D600, for around £1,000.

This big panel certainly looks the part: it's network connected, offers 2160p resolution and is 3D ready. A pack of eight cheap polarising 3D glasses are included in the box.

It's a nice enough looker, too. The bezel is thin, with a chrome wrap around the edge of the screen. The TV stands on two shiny plastic feet. Inside there's a single Freeview HD tuner, although you can record from it to a USB HDD.

There are four HDMI inputs, though only one HDMI is 4K HDCP 2.2 compliant. This will restrict your options as 4K content services begin to roll out. There's also component AV input, a minijack for SCART with a supplied adaptor, a trio of USB sockets, a digital optical audio for use with soundbars and a VGA PC input. In addition to ethernet LAN, the set offers dual-band integrated Wi-Fi.

Unfortunately, app support is rather limited. The set has a Netflix client, but as the TV lacks an HEVC decoder, there's no option for 4K streaming. Catch-up is limited to the BBC iPlayer, but you can also view YouTube, BBC News and Sport, Dailymotion, Viewster or download an assortment of general purpose diversions, such as Flickr, TuneIn radio, iConcerts, Accuweather, Twitter and Facebook. There's also a Media Player for DLNA network and USB sources. File support for video is wide, stretching from MKV to AVI. The audio player handles MP3, WMA, AAC, PCM and WAV, but not FLAC.

While this Polaroid may not impress with its catch-up provision, image quality is rather good. The P55D600 doesn't offer high refresh rates or image interpolation tech, but that's not an issue if you just want a big, cinematic pictures. It looks good with HD sources from TV and Blu-ray. With high contrast and vibrant colour reproduction, this is an easy image to like. It isn't a difficult set to set up either, although there are caveats. The TV ships with exaggerated edge-enhancement. Sharpness should be set to zero as anything higher introduces unwanted ringing artefacts.

To evaluate 4K performance we hooked up an Amazon Fire TV streamer. Marvel's *Daredevil* in UHD looks rich and gritty, but not overly different to when seen in HD. The set's edge lighting is a little scruffy, causing pools of light in the corners. As a consequence, we found *Hell's Kitchen* looked a little dull and cloudy in the shadows. Switch the Backlight control from Auto to Low to prevent the set from inadvertently switching itself off during low light scenes.

3D is more trouble than it's worth. Dimensional imaging is very directional, often resulting in the top half of the panel out of focus, while the bottom is in, or vice versa. Audio is unimpressive. The downward-firing speakers lack volume and sound monophonic.

VERDICT: Overall, this Polaroid does what it says on the box. While you wouldn't rely on the P55D600 for your catch-up needs, media playback is fine and image quality is entirely acceptable. Nothing fancy, just solid, pixel-packed images that please far more than you might imagine given the low price.

SAMSUNG UE48JU7000

£1,200 inc VAT • samsung.com/uk

Build	★★★★☆
Features	★★★★★
Performance	★★★★★
Value	★★★★☆
Overall	★★★★⯪

PC ADVISOR BEST BUY

While Samsung has more exotic panels higher up its range, principally the JS8500 and JS9000 series, the flat JU7000 (reviewed here in 48in guise, but also available in 55-, 60-, 65- and 85 inches) is its high street hero product. Impressively equipped and capable of super pictures, it puts forward a great case for not spending more.

Cosmetically, the set is distinguished by a bar pedestal that sits forward of the screen itself. The thin bezel is edged with a dark grey trim that's sombre but classy. It's not, however, a particularly slim set.

Interestingly, the JU7000 continues Samsung's policy of using an outboard interface box. While smaller than first generation One Connect boxes, it none the less offers four HDMI inputs, all HDCP 2.2 compatible, optical digital audio output and two USB ports. The box connects to the set via a single bus cable. On the TV is a third USB socket, plus ethernet and minijacks for component and SCART. Wi-Fi is dual band, and there's also provision for Wi-Fi Direct.

The set has two satellite tuners (generic not Freesat) and twin Freeview HD. Included with the JU7000 are two remotes, a standard IR job and a Bluetooth alternative.

Samsung has made some big changes to its connected offering, all for the better. The new Tizen smart platform is pleasingly minimalist, presenting itself at the bottom of the screen. It opens to reveal Featured apps and recent activity. Jumping around these is a breeze, thanks to a sprightly onboard processor.

Key attractions include BBC iPlayer, All 4, Wuaki.tv, ITV Player, Plex, YouTube and Viewster. Both Netflix and Amazon clients are 4K capable, confirming an HEVC decoder.

Multimedia playback is strong. Using the My Content mode, you can explore folders within a thumbnail browsing environment. File compatibility is good, with (most) of our sample MKVs playing, along with a good assortment of music codecs – MP3, AAC, APE, OGG Vorbis, FLAC, AAC, WAV,WMA – but not DSD.

Picture quality is outstanding, with vibrant colour performance courtesy of the brand's PurColor image processing. High contrast and good black level performance with subtle shadow detail add to its engrossing images. There's a quartet for picture presets (Dynamic, Standard, Natural and Movie), but you can make in-depth tweaks, most notably variable Dynamic Contrast (High, Medium, Low, Off) and Auto Motion Plus, which handles blur and judder.

4K content looks fabulous – *Marco Polo* (Netflix), a go-to-show for fine detail and texture, doesn't disappoint. Traditional hi-definition fares well, too. *Interstellar* (Blu-ray) looks wonderfully cinematic. It's all too easy to lose the celluloid feel on an LED backlit set, but switch off Auto Motion Plus and the film plays beautifully.

The screen also sounds surprisingly full bodied – you won't need to upgrade to a soundbar anytime soon. The set is Active 3D compatible, although glasses are an optional extra.

VERDICT: There's plenty to love about this 48in Samsung. Image quality shines with both HD and 4K content, the Smart TV platform is refreshingly functional and even that flat screen bête noire audio, is impressive. Only rather mundane build and design temper our enthusiasm. The JU7000 is a bit of a star.

PC ADVISOR TEST CENTRE

SONY KD-55X8505C

£1,200 inc VAT • sony.co.uk

Build	★★★⯪☆
Features	★★★★☆
Performance	★★★★★
Value	★★★★☆
Overall	★★★★☆

PC ADVISOR
RECOMMENDED

Sony offers a veritable army of 4K TVs, from the curved S85C to the high-res audio enabled XD93. The 55in X8505C reviewed here is one of its most affordable models – and in some respects it actually betters some of its more expensive stablemates.

The screen is fashionable without being fancy, thanks to a thin bezel and understated wire-frame pedestal. Speakers are hidden and down firing. Connectivity incudes four HDMIs, all of which are HDCP 2.2 compliant. There are also three USB sockets, plus component AV, SCART, digital audio output and ethernet. Integrated Wi-Fi is dual band. Twin DVB-S satellite tuners and two Freeview HD tuners support twin-screen viewing.

Two remote controls are supplied: a standard IR zapper, plus a Bluetooth touchpad. The set uses the Android TV Smart platform topped off with a YouView app. The Android implementation here is clunky and overly complex, but the YouView front end is slick and largely indistinguishable from a YouView set-top box. There's a complete set of catch-up services from the four mainstream TV channels: BBC iPlayer, ITV Player, All 4 and Demand 5. Amazon Prime Instant Video, Netflix, YouTube and Dailymotion lead the Android OTT services, but there's more in the Google Play TV apps, which include Plex, Musixmatch TV, Vevo, Mubi – a mix of pay and free – plus functional apps such as Google Cast.

Picture performance is outstanding. The screen is capable of extreme fine detail with 4K sources, and convincing black levels. At the heart of the set is the brand's latest X1 picture processor – and it's a hugely impressive piece of silicon. Be it HD or 4K,

there's depth and texture in the image, with excellent gradation. And while edge-lit, screen uniformity is pleasingly even. There's no ugly light pooling in the corners.

This is one of Sony's branded Triluminos Wide Colour Gamut panels – and it's quite a dazzler. The Live Colour setting allows you to alter saturation. The Low setting is best for skin tones, while Medium adds a tad more saturation.

The X8505C has an integrated HEVC decoder, meaning the Netflix client is 4K capable. The Amazon Prime service is 1080p only though. As we've come to expect from Sony, the quality of its HD upscaling is terrific, and Blu-ray looks marvellous remapped to 2160p.

Motion handling, long a strength for Sony, makes this a great set for sports. There's a selection of modes, all quite effective. The set's media player does a good job playing back multimedia files, be it from USB or a networked source. Our test collection of MKV, MPEG, WMA, MP3 and WAV, and FLAC files all played ball.

The set is Active Shutter 3D compatible, and it worked well in our tests – it comes supplied with two pairs of glasses.

Given the lack of space attributed to the set's audio system, it actually sounds reasonable, if monophonic. You'll want to add a soundbar, but later rather than sooner.

VERDICT: This UHD screen from Sony is quite the charmer. It's well specified, with a strong connected proposition thanks to that integrated YouView roll-back EPG, and image quality is spectacular – in fact it performs better than the slimmer, more expensive X90C.

Sony KD-55X8505C

How we test

Our 4K UHD TV hopefuls were put through their paces with a variety of Full HD and native 4K content. To further help assess motion resolution, colour performance, black levels and greyscale, we employed a variety of industry-grade test patterns.

All TVs were viewed with real-world content, delivered via onboard tuners, and with a selection of favoured Blu-rays, including *Kill Bill Vol 2* (Uma Thurman's burial is a dastardly test of dynamic

contrast) and *Interstellar*. All 2160p resolution panels upscale HD content to a lesser or greater degree – it's a task some do better than others.

Where appropriate, we also donned 3D glasses to see just how convincing a dimensional experience they delivered, with a little help from Disney's *Tangled* and *Avengers: Age of Ultron*.

Of course, to really gauge the value of these UHD screens, you'll need a Native 4K

source, and the only real options currently available are Amazon and Netflix. Some sets have these 4K services integrated, for the rest we delivered them via the Amazon 4K Fire TV box, an £80 streamer.

Finally, file-playback tests comprised accessing a collection of audio and video clips, comprising various codecs and wrappers, from both USB and a DLNA-capable QNAP NAS running Plex and Twonky Media.

	FINLUX £799 inc VAT ★★★½☆	PANASONIC £1,299 inc VAT ★★★★½ PC ADVISOR BEST BUY	PHILIPS £449 inc VAT ★★★★☆	
Product name	55UX3EC320S	TX-50CX802	40PUT6400	
Screen size	55in	50in	40in	
Resolution	3840x2160	3840x2160	3840x2160	
3D enabled	Yes	Yes	No	
Specified dynamic contrast ratio	4000:01:00	Supreme Contrast	N/A	
Brightness	350cd/m^2	N/A	300cd/m^2	
Speakers	2x 12.5W	40W (2x 10W and 2x 10W)	2x 10W	
Tuners	Freeview HD	2x Freeview HD, 2x Freesat	Freeview HD	
EPG	7 days	7 days	7 days	
Apps	BBC iPlayer, Netflix, YouTube, Twitter, Facebook, Viewster, Flickr	BBC iPlayer, ITV Player, All 4, Demand 5, Netflix, YouTube, Amazon	BBC iPlayer, Netflix, YouTube, Spotify Connect, Daily Motion, Philips App Store, Google Play	
Inputs	4x HDMI, 3x USB, SCART, component, VGA, phono audio in, CI slot	3x HDMI, 3x USB, SCART, component, phono audio in, SD card, CI slot	4x HDMI, 3x USB, SCART, component, phono audio in, ethernet, CI slot	
Outputs	Digital optical audio output, headphone jack	Digital optical audio output, headphone jack	Digital optical audio output, headphone jack	
Networking	Ethernet, Wi-Fi	Ethernet, Wi-Fi, Wi-Fi Direct	Ethernet, Wi-Fi, Wi-Fi direct	
Dimensions	123.2x10.6x71.3cm	112.1x4.6x65.2cm	90.4x8.3x52.6cm	
Weight	17.2kg	18kg	7.8kg	
Warranty	1 year	1 year	1 year	

PC ADVISOR TEST CENTRE

The best sets in our round-up, however, are the Panasonic TX-50CX802 and Samsung UE48JU7000. They share a similar specification and deliver delicious images with both HD and Ultra HD

Conclusion

You don't have to look hard to find Ultra HD temptation on the high street. However, while there are some big-screen 2160p bargains to be had, buyers need to be wary of screens with limited potential when it comes to HDMI connectivity and those with no onboard HEVC decoding functionality. If you're buying on a budget, then shaving a few screen inches could be your best bet – the Philips 6 Series 40PUT6400 is a good option.

While we loved the image quality from Sony's KD-55X8505C, its Android implementation is a trial to use – but at least it has YouView to fall back on.

The best sets in our round-up, however, are the Panasonic TX-50CX802 and Samsung UE48JU7000. They share a similar specification and deliver delicious images with both HD and Ultra HD. For us,

Samsung UE48JU7000

the Panasonic just pips its rival. While it loses an HDMI input, it's the more stylish option, has a larger screen for pretty much the same money, and edges it with its Firefox OS and the new connected Freeview Play rollback EPG. ⊠

	POLAROID £699 inc VAT ★★★½☆	SAMSUNG £1,200 inc VAT ★★★★½ **PC ADVISOR BEST BUY**	SONY £1,200 inc VAT ★★★★☆ **PC ADVISOR RECOMMENDED**
	P55D600	UE48JU7000	KD-55X8505C
	55in	48in	55in
	3840x2160	3840x2160	3840x2160
	Yes	Yes	Yes
	N/A	Mega Contrast'	N/A
	N/A	N/A	N/A
	2x 12.5W	2x10W	2x10W
	Freeview HD	2x Freeview HD, 2x Freesat	2x Freeview HD, 2 x Freesat
	7 days	7 days	7 days
	BBC iPlayer, Netflix, YouTube, Twitter, Facebook, Viewster, Flickr	BBC iPlayer, ITV Player, All 4, Netflix, Amazon, YouTube and apps store	YouView with BBC iPlayer, ITV Player, All 4 and Demand 5; Netflix, YouTube, Amazon
	4x HDMI, 3x USB, SCART, component, VGA, phono audio in, CI slot	4x HDMI, 3x USB, SCART and component via adaptor, phono audio in	4x HDMI, 3x USB, SCART, component, phono audio in, CI slot
	Digital optical audio output, headphone jack	Digital optical audio output, headphone jack	Digital optical audio output, headphone jack
	Ethernet, Wi-Fi	Ethernet, Wi-Fi, Wi-Fi Direct	Ethernet, Wi-Fi, Wi-Fi Direct
	123.4x5.5x71.1cm	108.7x6.7x63cm	123.6x6x72.2cm
	19.6kg	11.1kg	19.9kg
	1 year	1 year	1 year

6 BEST HOME SECURITY CAMERAS

A boom in wireless security cameras is inspiring a movement in DIY home surveillance. Read on to find the best option for you. By Michael Ansaldo

Whether we rent or own our home, we all want to know that it is secure while we're gone. That used to mean signing on with a professional – and pricey – security service. But the boom in wireless security cameras is putting home surveillance into our own hands.

These close cousins of webcams require minimal installation and offer flexible setups and a range of security features. Indeed, the offers vary widely from camera to camera, and navigating them all gets more daunting as this category grows ever more crowded. To help you find the best security camera for your needs, we've outlined the key features to consider and tested six of the newest, most high-profile models.

Whether you're looking for an easy way to check on your children and pets, or a full-service sentinel to monitor for intruders, we have the right product for your needs.

What to look for when shopping

Most home security cameras perform the same basic functions – they detect an event, record the event and send you an alert – but they don't all perform them the same way. And some cameras have special features that go beyond those basics. Here are some common features you'll encounter while shopping and why they're important (we've listed them in alphabetical order). In each of the reviews that follow this buyers' guide, we'll discuss how each camera delivers on these features.

Alerts: Home security cameras push notifications to your smartphone when they detect events. Without watching the live feed all day, this is the only way to keep tabs on your home in relative real time. Depending on the camera, it may send text alerts when it detects motion, sound, a face (known or unrecognised), or all three. Some can send alerts to multiple people, usually anyone else in the household using that product's app; others will send emails in addition to text messages as a fail-safe in the event you can't access your mobile device.

Battery backup: Power outages happen, and clever burglars cut electricity before breaking into your home. When that happens, your camera goes dark and, if there's a crime taking place, you lose all forensic evidence. For this reason, some cameras can also run for a short time on battery power. It's a feature worth looking for.

Cloud recording: Many manufacturers offer cloud storage plans with their camera. With one of these, your recorded video is sent to a remote server and stored for a predetermined time – usually anywhere from 24 hours to a week – and then deleted to make space for new videos. Though sometimes free, these cloud plans usually require a monthly subscription, but are worth it both for their convenience and if you want a surveillance record during a holiday or other extended time away from home.

Facial recognition: A few newer cameras are experimenting with facial recognition. This feature could more accurately be called 'facial identification', as in practice it's much better at distinguishing a face from, say, a lamp, than it is at actually distinguishing between one person's face from another's. If you opt for a camera with this feature, know that it typically learns faces through increasing exposure to them, so be prepared to spend a lot of time in front of the lens.

Local storage: Some cameras include memory-card slots in lieu of, or in addition to, cloud storage, so you can store video right on the device. It's an attractive feature as it can eliminate the cost of monthly storage fees. The downside (if there isn't a cloud backup) is that if a thief steals your camera, he takes your forensic evidence with it.

Mobile app: Most of today's home security camera's are accessed primarily through a smartphone/tablet app. In addition to offering you a reliable way to view the camera's live feed, it should offer plenty of options for customising the way the camera performs. The ability to customise notifications, adjust motion and sound detection sensitivity, and set detection areas are some of the key features to look for. The app should also be easy to master.

Motion detection: Assuming that you're monitoring your home when it's empty, motion detection is one of the most desirable features in a security camera. Built-in sensors pick up movement within the camera's field of view and trigger video recording. Because these sensors

are sensitive to any movement – event a shift in lighting or leaves blowing outside a window – it's important the camera system also offers the ability to narrow the range of detection, adjust the sensor's sensitivity or otherwise customise this feature to cut down on false alerts.

Night vision: Most break-ins occur after dark, so this feature is nearly as important as motion detection. Technically, most home security cameras support infrared LED illumination, versus true night vision based on image intensification or thermal vision. Be that as it may, some camera's will switch to night vision automatically in low-light conditions, while others allow you to customise when and how it should be activated.

Pan/Tilt/Swivel : Most security cameras – including all the ones in this guide – can be manually tilted and swivelled to focus on a certain viewing area, but this is a purely set-it-and-forget it feature. A true pan/tilt camera is equipped with a motor so that you can move its lens – or even follow a moving object if you're watching a live feed – using its app or browser-based app.

Resolution: No amount of security video will help you if it's blurry, jittery or otherwise distorted. Look for a camera that offers the highest possible resolution. Most currently offer 720p (often referred to as 'high definition' or HD), but some newer cameras are coming out with 1080p (often referred to as 'full HD'). Keep in mind

higher resolution cameras use more internet and Wi-Fi bandwidth and battery life. Many cameras also offer a software zoom feature (which is not the same thing as having a physical zoom lens).

Scheduling: Scheduling features allow you to tell the camera to turn on and off, detect motion, and/or send alerts at specified times. This is useful when you, for example, only want to be notified when your children get home from school or just want to monitor your home when you're away. It also reduces the amount of false alerts.

Security: There have been plenty of headlines about hackers compromising home cameras, baby monitors, and other Wi-Fi devices to spy on people, so check what steps each manufacturer has taken to eliminate this problem. Look for a camera that supports up-to-date wireless security protocols, such as WPA2, and ensure it encrypts internet transmission of your username, your password, and the live feeds. Never install a security camera (or any other device on your home network) without changing its default user ID and password.

Two-way audio: While the idea of a security camera implies eyes-on monitoring, the ability to also hear what's going on gives you a more complete picture of what's happening on the home front when you're away. It can also alert you to something occurring out of the camera's field of vision. This feature can also allow you to speak through the camera, a great tool for

remotely commanding an unruly pet or startling an intruder in the act, but be aware that you might need to plug in a powered speaker for this feature to work.

Viewing angle: The camera's field of view determines how much it can see. As you're probably monitoring a single room, you want a wide viewing angle. Most current cameras fall in the 130-degree range. These wide angles can sometimes cause image distortion at the edges in the form of a fish-eye effect, particularly when used in smaller rooms, but it's not like you're going to use a security to capture snapshots for your photo album.

Web client: Many cameras can be accessed through a web portal as well. This is useful for times when you don't have access to your mobile device or a wireless connection. The web app should closely mirror its mobile counterpart, so you don't need to learn a whole new set of controls.

Wireless range: One of the benefits wireless cameras offer is the ability to move them around your home. Ideally, your home security camera should be able to maintain a Wi-Fi connection no matter how far you move it from your router, even in a large home. Some cameras come with an ethernet port as well, so you have the option of hardwiring it to your local network. A camera that supports Power over Ethernet (PoE) eliminates the need for an AC adaptor and relies on just one cable (but your router or switch will also need to support PoE. Another alternative would be to use a PoE injector.)

FLIR FX

£149 inc VAT • flir.co.uk/flirfx

★★★½☆

Flir is best-known for building thermal cameras that help users detect household problems such as pest infestations and leaky pipes. Flir FX is the company's first home security camera, and at £149 it's priced to compete with the Nest Cam – successor to the popular Dropcam Pro – and other DIY models such as the Netatmo Welcome and Logitech Circle.

But Flir FX has ambitions beyond home security. If you're willing to spend extra for the appropriate accessories, the modular camera can also can be retrofitted as an outdoor surveillance camera, a GoPro-like action camera, or a dashboard cam. We only tested it in its indoor surveillance capacity, and it impressed with its array of features. But it has some hurdles to overcome before it's ready to contend in an already crowded DIY security category.

What you get

The camera comes on a detachable stand, and its power cable can be connected to this base or directly to the camera. Two internal batteries – one in the camera and one in the stand – combine for up to four hours of power, allowing you to untether it for more mobility or to capture security footage in the event of a power interruption.

Flir optional outdoor enclosure FLIR

You can also order an outdoor housing for a £70 premium over the standard indoor model. As is becoming more common in this increasingly competitive category, Flir FX can record video in 1080p resolution – though it streams in 720p – and it offers a generous 160-degree viewing angle. It's equipped with an integrated mic and speaker for two-way audio, and it has infrared 'night vision' up to about 30 feet for operation in low-light indoor conditions.

Flir FX can detect sound, not just motion, and you can set it up so that either event type will trigger a video recording. To reduce false alerts, the Flir FX app employs Flir's SmartZone technology, which lets you designate monitoring areas on a grid that overlays

the video. Movement in one of these zones will trigger a recording and push and alert to your mobile device; any motion outside the specified area will be ignored.

The system's other compelling feature is Rapid Recaps, which can condense hours of footage into an activity highlight reel. Rather than a time-lapse digest that presents a linear chronology of events, Rapid Recaps compiles all motion activities within a time frame you specify and compiles them into a single video. The result is you view all those individual events at once, with timestamps on each moving object to tell you when it occurred.

Flir Rapid RecapFLIR

Flir's RapidRecap feature can show you the events it recorded over a period time, with timestamp overlays on each event. All recorded footage can be saved locally to an SD card or stored in the cloud via one of Flir's subscription offers – and you must have a subscription plan to create RapidRecaps. Flir FX includes complimentary access to Free Cloud Basic, which gives you 48 hours of video storage and three RapidRecaps per month. FLIR Cloud Plus and FLIR Cloud Premium extend storage to seven days and 30 days for $10 (£6.50) per month and $20 (£13) per month respectively. Both of these plans come with unlimited RapidRecaps.

If you want to use Flir FX to capture your extreme sports adventures – terrestrial or underwater – be prepared to shell out an additional £70 for Flir's sport camera case. To use it as an in-car camera, you'll need the £49 dashboard mount. The outdoor housing, as we've said, costs £70.

Setup and usage

Setting up the Flir FX hardly went smoothly in our tests. The first camera Flir provided us with wouldn't power on, and, after it determined that it may have shipped us a pre-production unit, it sent us another. This one powered on initially, but we couldn't complete the setup process, which involves scanning a QR code on the bottom of the camera and connecting it to your Wi-Fi network. Despite about a half-dozen attempts following the in-app prompts, we couldn't get the app to recognise the camera. Shortly after, that the camera stopped powering on and we were unable to revive it despite help

from a representative from Flir's engineering group.

Third time's the charm, though, and after Flir sent us yet another unit, we got the camera up and running. Even when the setup went as designed, however, it wasn't as plug-and-play as other security cameras we've tested. The camera must first charge for about 20 minutes, and the connection process requires you to switch back and forth between the Flir FX app and your device's Wi-Fi settings. Altogether, it was about a half an hour between unboxing the camera and getting it online.

When you're within 500 feet of your router, Flir FX gives you direct Wi-Fi access to your live feed and videos on SD card. Beyond that range, the connection switches over to Flir's cloud servers. In practice, the transition is seamless. We noticed no difference in connection quality; whether we were home or out and about, the feed was smooth and the audio was clear.

Positioned atop the entertainment centre in our living room, the 160-degree lens gave us a view of almost our home's entire downstairs with no image bending. Streaming video was periodically pixellated and choppy, usually when something or someone was moving quickly through the frame, but the recording of that event would be sharp and smooth. Night vision made the image grainier, though, with less tonal gradations, which made it tough to see details in the environment.

The Flir FX is accessed and controlled through its accompanying mobile app (Flir says a web portal is in he works). A thumbnail image of the room being monitored appears on the home screen. Tapping the three-dot 'more' menu on a bar above this image opens a drop-down menu with options to create RapidRecaps, view recordings, and turn notifications on and off.

The app is intuitive. Tapping the thumbnail image takes you to camera's live feed. Two buttons appear beneath the feed window: Actions and Recording. Pressing the first opens a radial menu with options to (again) create RapidRecaps, use the microphone, take a snapshot of the

feed and save or share it, and access settings such as night vision and sound and motion sensitivity. As you'd expect, the Recording button opens its own radial menu from which you can stop and start recording and activate/deactivate sound- and motion-triggered recording.

False alarms are inevitable with any security camera, but we were successful in reducing the Flir's by calibrating the camera's motion sensitivity. You adjust this using a slide control that ranges from low to high. We found the sweet spot to be right in the middle. We cut down alerts even further by creating a SmartZone that limited the motion-detection area to the front door. With the camera trained on that space, we were getting an alert once every hour or two with our family in the house, and that was only when they walked in front of the door on the way to the stairs.

Sound sensitivity proved tougher to master. Even with it turned all the way down, we received 'audio event' alerts every few minutes, even with just the pets in the house. We finally turned off sound-triggered recording to save storage space.

At one point, we decided to create a RapidRecap of some of the overnight footage we recorded. This entails swiping along a scrolling timeline to set the start and end times for the hours you want to capture. Creating the recap isn't quick; we selected a span of five hours and the recap took a full five minutes to produce.

As far as we could see, there was no progress monitor other than a percentage above the RapidRecap icon, which is visible only when the actions menu is open. We did, however, get an alert when the recap was ready.

The resulting videos – plural, because RapidRecap breaks the activity up into smaller videos to keep the scene from becoming too busy – combined several events triggered by the family cat's nocturnal wanderings into a collage of ghostly images of him stalking and leaping over himself. It was an eerie effect heightened by the night vision and floating timestamps. Though it made for curious viewing, the superimposing of asynchronous images over each other made it tough to follow the chronology the footage. While it may be okay for a log of the day's events, it's probably not something you want to contend with if you're trying to provide forensic evidence of a crime to the police.

We didn't manage to get the mic to work, though. Each time we used it, not only did no sound come from the camera, but the app – including the live feed – froze. Sometimes we'd get an error message, and other times the feed would refresh and the app would start working again.

VERDICT: If you're considering purchasing your first DIY security camera, Flir FX has a lot to like. Its 160-degree viewing angle, double battery, and combination of local and cloud storage outdoes many of its competitors. Its app is well designed and extremely easy to use, and it offers the flexibility to configure sound and motion detection so that it's accurate without being intrusive.

But while it's a good idea, the daily video recap is implemented better in the Logitech's Circle's Day Brief feature than it is here. The mic issue and the hardware problems we experienced with the first two units we were provided also raise some concerns.

If you're willing to weather a new product's growing pains, you'll likely love what the Flir FX has to offer. If not, then you're better off exploring the many other cameras on the market until Flir gets some of these issues ironed out.

LOGITECH CIRCLE

£159 inc VAT • logitech.com/en-gb/ ★★⯪☆☆

Logitech is no stranger to the swelling home-security market, having marketed the WiLife and then the Alert series of cameras (both of which have since been discontinued). The company is now taking another stab at the market with the £159 Circle. But while this camera is priced to sell along side other home-monitoring cameras, its lightweight security features make it more suited for capturing precious moments than bad guys.

What you get

Given Logitech's years of experience making webcams, it's not surprising the Circle doesn't stray far from that design style. The pod-like camera is about the size of a tennis ball and sits on a charging dock and ring-shaped magnetic mount. As this last piece can also be screwed into a wall, the Circle can be placed on virtually any horizontal, vertical, or other-angled surface. Aside from the activity light – which shines white when the camera is watching – there are no buttons or other adornments on the camera.

The ball portion of the camera can swivel 360 degrees without losing contact with its charging base and pivot up and down. It's recommended that it remain plugged into a power outlet, but it does have an onboard battery Logitech claims is good for about three hours (12 hours in low-power mode),

so surveillance will be uninterrupted in the event of a short power outage or an intruder cutting your home's electricity.

As the Circle's 135-degree lens monitors the environment, the camera streams live video to your smartphone in 720p HD resolution with 8x digital zoom capability. In low-light, the camera can switch to infrared night vision with a range of up to 15 feet. A two-way audio system lets you remotely communicate with pets, children, or anyone else in your home.

When the Circle detects motion, it starts recording and pushes a notification to your phone. You then have 24 hours to review the motion event and have the option to save the event locally to your phone for later viewing. Lest you think you're going to get an alert every time your kitchen curtains flutter or there's a change in daylight, the Circle features a technology called Scene Intuition which extracts objects, people, and faces, from the monitored environment while

As the Circle's 135-degree lens monitors the environment, the camera streams live video to your smartphone in 720p HD resolution with 8x digital zoom capability

MY CAMERA - LIVE 03:03:13 PM

filtering out unwanted motion triggers, such as moving leaves. Another feature called Day Briefs eases the headache of slogging through hours of surveillance footage. Using Scene Intuition, the Circle rounds up the day's most 'interesting and important' events and generates a 30-second time-lapsed highlight video so you can easily digest all the day's action.

Recorded video is encrypted and stored free in the cloud for 24 hours, after which it's deleted to make room for the next day's footage. Each account has its own private cloud on the Circle Cloud Service and is protected by an account password. According to Logitech, longer-term storage options under a premium (that is extra cost) offering are in the works.

Setup and usage

The Circle immediately differentiated itself with its easy setup. The camera came charged, so we just set it on top of our entertainment centre and downloaded the app, which is the sole interface for the camera – there is no web portal. Within seconds of launching the app and logging in to our home network we had a 135-degree wide-angle view of our living room.

The app's main screen shows your live feed in landscape mode only, with a scrolling activity log of time-stamped events down the right side. To view a specific recording, you just press the time-stamp. Tap the Day Brief icon to get a CliffsNotes version of the day's recordings. These daily roundups are actually the Circle's best feature; one we'd love to see more security cameras adopt.

Swiping left on the feed screen opens an overlay with the camera's control panel. From here you can turn the camera on and off, put it in low-power mode, activate night vision, and perform a few other basic functions.

One afternoon, we decided to use the camera to check on our dog while we were away. We put him in the foyer when we know we'll be gone for just a short time, but there's no convenient surface there to place the camera, so we unplugged it and mounted it on the metal staircase banister. That gave us the perfect vantage point for monitoring him, and the two-way audio gave us the opportunity to listen in and give him voice commands when he got into mischief. We also found, however, that the Circle's battery lasted only about half of the promised three hours.

Live video was clear in all our tests, with accurate colours in both day and night mode; but there was significant image bending at the top and sides of the frame. Predictably, using the pinch-and-zoom feature rendered the image fuzzy, making it hard to distinguish smaller details.

Because the Circle offers Scene Intuition in lieu of the manual motion-detection settings offered by most other cameras in its price range, you're at the mercy of Logitech's algorithms when it comes to determining what's an 'interesting' event. It became apparent that the Circle's definition is 'anything that moves in front of the camera'. After receiving generic notifications stating 'Activity detected on My Camera', we'd frequently find recordings triggered by a rotating fan or our dog's wagging tail.

To be honest, Circle is distinguished more by what it doesn't offer than what it does. There are no scheduling capabilities, and you can't program it to record specific movements, patterns, or times of day. There's no web app, nor are there options for managing notifications.

Logitech tries to qualify this by calling it a 'home connection camera', but the reality is at £149 it's competing with the likes of Nest Cam, Flir FX, and other full-featured security cameras. By that measure it falls well short.

VERDICT: The Circle offers decent video quality, flexible mounting options, and a simple app if you're willing to pay a premium for a nanny/puppy cam. But the lack of customisation options hamstring it as a security camera. A Logitech representative assured us the company plans to incorporate features such as scheduling as the product evolves, and that it's currently working on a web app. With the addition of these kinds of advanced features, we could see Circle developing into a contender. Until then, there are plenty of better options on the market.

MYFOX SECURITY CAMERA

£169 inc VAT • getmyfox.com/uk ★★★☆☆

The MyFox home-security camera can operate on its own or as part of the MyFox Home Security System, a product that initially impressed but ultimately disappointed us due to the system's limitations. The company's camera is burdened by some of the same concerns, and it feels a few iterations away from holding its own with similarly priced security cameras.

What you get

The MyFox camera sits inside a cylinder about the diameter of a drink coaster, which rests on edge atop a plastic base. While you can change the vertical angle slightly by rotating the camera up and down on this base, there's no side-to-side swivel – you must reposition the entire unit to change its horizontal viewing angle.

The camera comes with a long power cable that gives plenty of leeway for positioning it away from power outlets. It also has an internal battery that will keep the camera rolling for an hour if there's a power outage. MyFox sends an alert to your phone when the power goes out, and again when it's restored. If it loses its connection to the internet, the camera will record footage to its internal memory. If you pay for continuous recording service, it will transfer the video to MyFox's servers when the connection is re-established.

MyFox features streams in 720p with a 130-degree wide-angle lens and night vision up to 5m. It also boasts a two-way intercom that's activated from the MyFox app.

The camera's most compelling feature is a motorised shutter that's controlled from the MyFox app and covers the lens whenever the camera is turned off. It's a feature that's surprisingly assuring

given the privacy vulnerabilities that have been discovered in many webcams and other home-monitoring devices.

While the camera provides a live feed out of the box, you need a subscription to one of MyFox's cloud-recording services to store video in the cloud. For £3.99 per month you get one day of video history; £7.99 per month gets you an entire week of storage. MyFox is currently offering a free two-week trial with the second option.

Given the French manufacturer's experience in home security, you get the expected level of care with your data. Video transmission between the camera and the cloud uses a 2048-bit SSL encryption key, and video streams are encrypted with 2048-bit Transport Security Layer (TLS). The same encryption level is used when connecting your
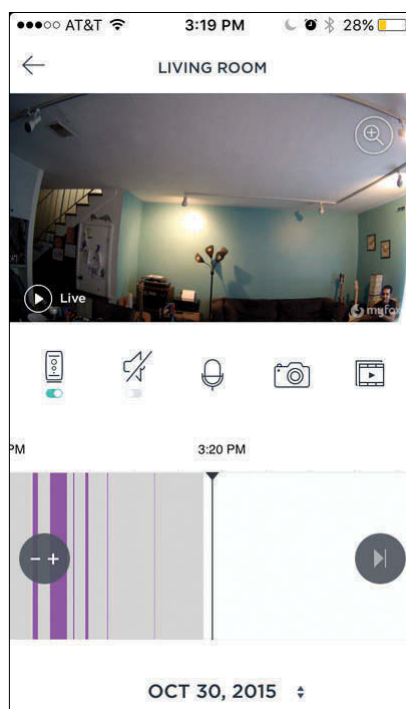
The purple bars in this scrolling timeline in the MyFox indicate security events in MyFox's live feed

PC ADVISOR TEST CENTRE

smartphone to MyFox cloud. All videos are stored with AES-256 encryption.

Setup and usage

Setting up the MyFox is simple: once you have downloaded the app, it walks you through the process for creating an account, entering your Wi-Fi information and adding the camera to your network. The whole thing took about three- to four minutes.

MyFox's 720p video is pretty standard in this price range, and it's crisp and clear with moderate fish-eyeing in smaller rooms. It remained that way when switched to night mode, and there was minimal distortion when using the 4x 'magic zoom' on the image in either mode.

In addition to the power and internet outage alerts, MyFox sends you a notification if the camera detects motion. Unlike with some other cameras, MyFox doesn't offer a way to adjust the sensitivity of the motion detection, so we received alerts every few minutes because one of our cats moved in proximity of the camera. It was annoying enough that we eventually turned the motion detection off.

We tested the mic while we were in the house and the audio was plenty loud but a little buzzy, with no improvement even when we held the phone farther away from our mouth. The sound from the live feed was actually much clearer, and we could easily make out conversations the camera picked up when we were in another room.

You access your live feed by selecting your camera from the MyFox app's home screen – the feed appears at the top. Beneath that, you'll find controls for the privacy shutter, microphone, and speaker, and a button to take screenshots of your video feed that are saved to your phone's camera roll. Under these is a scrolling timeline where security events are recorded as purple bars; you just scroll the timeline back to one of them to view that event's video footage.

Despite this labyrinthine menu, the app doesn't offer much in the way of camera customisation options. Every function – motion detection, night vision, HD video – comes with basically two options: on or off. Several comparably priced cameras allow you to set motion
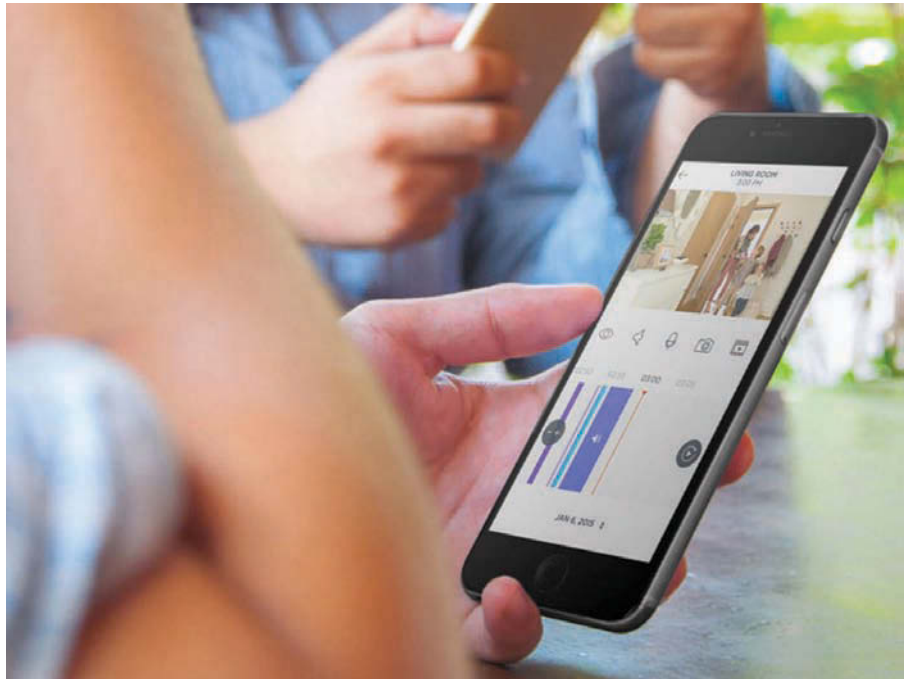
The camera's most compelling feature is a motorised shutter that's controlled from the MyFox app and covers the lens whenever the camera is turned off

detection areas or to change the intervals at which you receive alerts to reduce false alarms and nagging notifications. None of those were available with this camera.

We asked a MyFox representative about this and was told that scheduling options and the ability to manage notifications are currently available only to customers who use the camera as part of its full MyFox security system. The spokesperson said the company is working on making notification management available to customers who purchase the camera on its own.

Finding your way to the settings the MyFox camera does have is something of a challenge. One would logically assume they'd be under the menu header 'settings', but this contains just one control: a button to deactivate the automatic opening and closing of the shutter. To find the rest, you must tap the menu button and follow the path System > [camera name]. It's hardly intuitive, and we felt the app was unfinished.

VERDICT: The MyFox security camera is a solid piece of hardware. But the app, with it's lack of customisation controls and muddled menu layout, really limit it as a home-security solution. The camera's privacy shutter is its strongest feature by far. Knowing someone can't remotely hack their way into our living room when we're home because the lens is covered helped us feel more at ease. If only the camera made us feel that secure when we were away from home.

Any home security camera worth its salt will support motion detection

NEST LABS NEST CAM

£159 inc VAT • nest.com/uk ★★★½☆

Nest launched its first security camera, the Nest Cam, earlier this year. In essence, a sleeker version of the Dropcam Pro – which the Alphabet-owned company acquired when it bought Dropcam in 2014 – the Nest Cam also brings a few improvements, including sharper video, enhanced night vision, and better sound and motion detection for the same £159 price.

What you get

The most noticeable difference from the Dropcam Pro is that Nest Cam looks and feels like a more quality product. A new swivel joint gives you a lot more flexibility for choosing viewing angles, and its magnetic base provides many more mounting options. It also comes with a wall mount and screws for more secure and permanent placement. As an extra security measure, there are no buttons on the camera itself; all functions are controlled from the Nest app.

While Nest Cam provides the same a 130-degree wide-angle view as Dropcam, it streams in 1080p – a bump from Dropcam's 720p – at 30 frames per second. Eight infrared LEDs ringed around its lens deliver enhanced night vision, and an integrated mic and speaker enable two-way communication.

Once it's set up, Nest Cam scans the environment to get a baseline of the room when it's still. Once you enable motion alerts, the built-in sensors trigger the camera to record video of the scene and push notifications to your mobile device if it picks up a door opening, a body passing in front of the camera, or other movement. If you enable audio alerts as well, Nest Cam will respond similarly when it detects sounds above the ambient noise level of the room.

One crucial difference between Nest Cam and some other cameras we reviewed is that it must be plugged in to an outlet at all times – Nest Cam does not have battery backup. That's significant, because if the electricity goes out or an enterprising burglar cuts the power to your home, the camera stops working.

You get free access to live video out of the box, but you'll need to pony up for a Nest Aware with Video History subscription to take advantage of all Nest Cam has to offer. You can sign up for either a 10- or 30-day cloud-stored Video History plan (for (£8 per month or £80 per year; £24 per month or £240 per year respectively), which will let you review past recordings for the selected term.

Either subscription will also let you create and share video clips, condense a day of video into a 30-second time lapse, get advanced motion alerts that reduce false alarms, and create Activity Zones to keep a closer eye on designated areas. You get a free 30-day Nest aware trial when you purchase a Nest Cam; it starts as soon as you add the camera to your Nest account.

Setup and usage

Nest Cam offers two painless setup options: via the Nest app on a Bluetooth LE-capable smartphone or tablet, or through the Nest website on a Mac or Windows computer. Using the app method, you'll be required to scan the QR code on the back of the Nest Cam with

With 1080p video streams, the Nest Cam delivers higher resolution than many of its competitors

If you're looking to buy your first Wi-Fi security camera, Nest Cam's sleek, sturdy design, impressive video quality and easy-to-use app place it near the top of the heap

your device; you'll need to connect the camera to your computer via USB cable to do the website setup. In either case, the Nest setup wizard walks you through the process of adding the camera to your Nest account and connecting to your home Wi-Fi network.

Whereas most of the other security cameras in our guide seem designed to blend in with your home's furnishings, Nest Cam's all-seeing eye peered conspicuously from wherever we placed it, but perhaps that makes it more of a deterrent to bad behaviour, whether by unsupervised children or intruders.

The Nest Cam maintained a strong connection to our Wi-Fi network, even when we moved it to an upstairs bedroom (our router is downstairs). Video was crystal clear, even with night vision turned on, and there was only moderate fish-eye distortion at the edges, usually when we placed it in a smaller room where it had a shorter focal length.

The Nest app provides everything you need to manage the camera. Once you select your camera from the home screen, you'll see your live video feed. From this screen you can turn the camera on and off, activate the mic, pinch-and-zoom in on a specific area, and view your history of motion events. From the settings menu you can change the video resolution, turn alerts on an off, and schedule the camera to automatically turn off a specified times or just when you're home.

If you have Nest Aware account, this is also where you'll be able to set your activity zones, create video clips and use other advanced functions. You can also control these features from the Nest web client.

Motion detection was pretty sharp in our tests. When the camera was trained on the centre of our living room, the sensor was triggered only if a body – human or non-human – moved. It never sent alerts for incidental motions such as a fluttering curtain or leaves blowing in the breeze outside our patio window.

A slightly upgraded Dropcam Pro, Nest Cam boasts improved resolution and a sleeker design

Sound detection was less predictable. While it paid no mind to the air purifier and fan running in our living room, it also didn't react to a loud hand-clap or to this reviewer moving items around on a table, though it was triggered by a cough.

We found the app could be a bit buggy at times. Frequently when switching back to the live feed from another screen, it wouldn't show an image or we'd get a message saying the camera wasn't connected, even though it was. Each time the issue resolved itself within several seconds, but it could be disconcerting if you get notified of a real-life event and just want to see what's going on at home as quickly as possible.

More potentially troubling is the 30-minute delay between notifications. Nest says this is by design, to prevent customers from being overwhelmed. While we certainly appreciated not being bombarded with alerts every time our dog or cat walked in front of the camera, it did raise the question of what would happen if, say, pet movement triggered a notification, and then moments later someone broke in to the house. Admittedly, this is a pretty unlikely scenario, but still it seems like notification intervals of every 10- to 15 minutes would be more prudent, if only for peace of mind.

VERDICT: If you're already using Dropcam Pro, Nest Cam's improvements aren't significant enough to warrant an upgrade. Viewed on a smartphone screen or on the web, the difference between 720p and 1080p is barely noticeable, particularly on surveillance footage. If you're looking to buy your first Wi-Fi security camera, however, Nest Cam's sleek, sturdy design; impressive video quality; and easy-to-use app place it near the top of the heap.

If you also own a Nest Learning Thermostat and a Nest Protect smoke and carbon-monoxide detector, deploying a Nest Cam lets you integrate all three devices. The Nest Cam can relay a message to the thermostat that you've arrived home before you walk past the thermostat's motion detector, for instance. And if the smoke alarm goes off, it can trigger the camera to snap a picture that might identify the source of the flames.

Just bear in mind that without the features a Nest Aware subscription brings, the Nest Cam is little more than a webcam. The subscription adds substantially to the cost of ownership, and other cameras offer similar features for free.
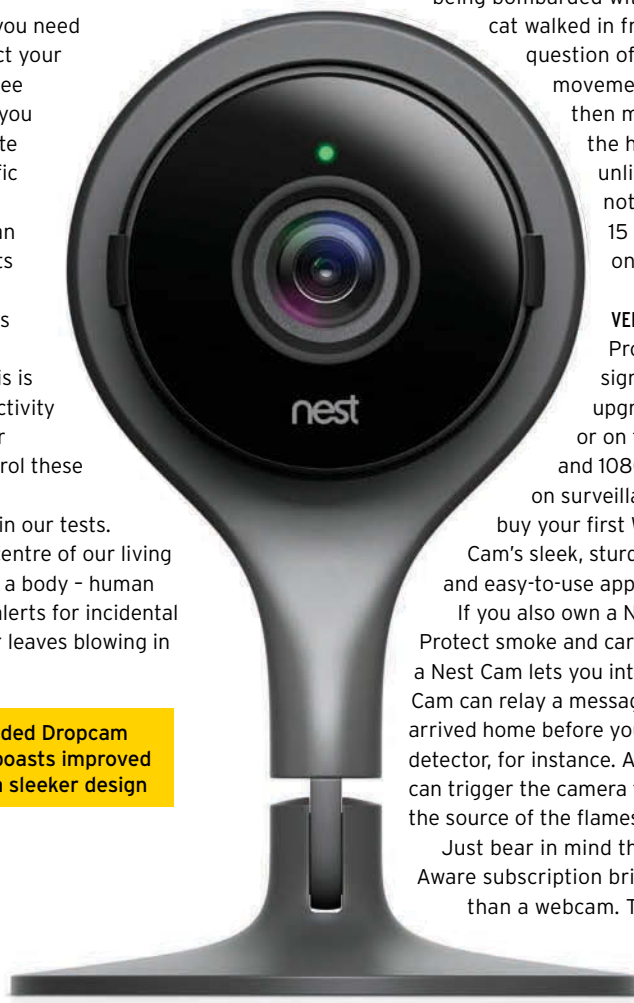
NETATMO WELCOME

£199 inc VAT • netatmo.com ★★★☆☆

Most Wi-Fi security cameras are designed to look for people who aren't supposed to be in your home. The Netatmo Welcome is made to look for the people who are. The smart appliance manufacturer built this £199 camera around facial recognition and a personalised notification system that seeks not only to reassure you of your loved ones' safety, but to improve its ability to distinguish between real security incidents and false alarms. In the real world, however, the Netatmo struggles to get to know your family, and it's missing many of the features that other cameras in its price range deliver.

What you get

It looks nothing like a home-security camera. The indoor/outdoor device is housed in a tall, thin aluminium cylinder with a metallic finish much like its sister product, the Netatmo Urban Weather station. The design makes it blend easily with other knick-knacks in your home, and it reduces that feeling of Orwellian dread more-conspicuous security cameras can produce in your family and guests.

Netatmo Welcome must be plugged in to a power outlet as it doesn't have a battery backup. The camera also has a USB port, so you can connect it to a computer, and though it's designed for Wi-Fi, it includes an ethernet port if you prefer a wired connection.

Its 1080p streaming, 130-degree field of view, and infrared LEDs for night vision put it on par with the Nest Cam, but that's where the similarities to the current gold standard in home security-cameras end. Netatmo Welcome detects motion, but not sound; and it has no two-way audio for remote communication.

Its marquee feature is facial recognition that can distinguish up to 16 people. Once the Netatmo Welcome 'learns' faces, you can customise the alerts triggered by each individual. Ostensibly, this is

so you can keep tabs on children and elderly parents, but it should also help cut down on false alarms when a 'known' person passes in front of the camera.

Unlike most other home-security cameras at this price point, the Netatmo Welcome doesn't support any cloud recording plans. Instead, all video is recorded locally to an included 8GB SD card that slots into the back of the camera. The benefits of this setup are obvious: It eliminates the cost of monthly storage fees, and keeps the security of your video in your hands. But it also means that if an intruder takes your camera, you lose all forensic evidence of the break-in.

Setup and usage

The Netatmo Welcome had one of the easiest setups of any camera we tested. Other than the peculiar requirement to turn the camera upside down for the duration of the setup process, there was nothing remarkable about adding the camera to our Netatmo account and home Wi-Fi network. The Netatmo Welcome mobile app (there's no web option) walked us through the steps and the whole operation was completed in less than two minutes.

Netatmo doesn't include any wall-mounting or magnetic accessories, so you're limited to placing it on flat surfaces. We

positioned it on our living room entertainment center one bustling school morning, and within minutes it was sending regular motion alerts.

It also immediately started trying to recognise faces. When we first opened the app, the home screen presented us with a series of snapshots of ourself and each of our family members, each with a question mark next to it identifying them as unknown faces. Each of these snapshots represented an event where the camera picked up human features. Tapping on a face takes you to the video clip of the triggering event. Long-pressing a face, allows you to identify that person.

When you start the face-identification process, you're presented with three options: 'identify', 'forget this person', or 'not a face'. As the camera didn't recognise our dog or a lamp as a face, we didn't have to use the last one. Selecting 'identify' gives you two choices: build a new profile, or correct the camera if it didn't recognise someone it should have.

Building a profile allows you to name the person and add a photo, either the snapshot taken by the camera or a different picture. If there are multiple shots of the same person marked as identified, you can add each one to that person's profile. This will help increase their 'profile strength', represented by a meter of one to five bars that indicates how well the Netatmo system knows them.

Based on our usage, building that strength takes time. The system learns to better recognise a face as it's increasingly exposed to it at different angles and in different light. We also had to do a fair amount of correcting the system when it marked an previously identified face as unknown. According to Netatmo, it can take a couple of weeks to build a full-strength profile, but considering it 'learns' primarily by capturing fuzzy images of people in motion, it's tough to imagine its recognition will ever be as foolproof as we'd like.

All recognised faces are designated as either Home or Away. Anytime the camera sees a face, that person is identified in the app as being home. 'Away' is a misnomer; the system says a person is away if it hasn't seen them for a certain period of time, even if they're actually home but out of view of the camera. The default is four hours, though you can change this in the app to be anywhere from one to 12 hours in 15-minute intervals.

You can also personalise settings for each person in their individual profile. By
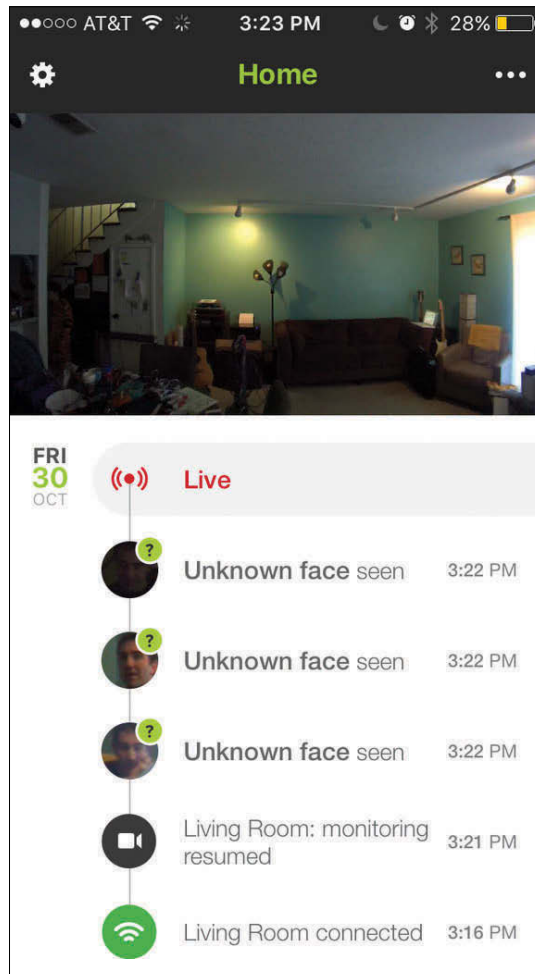
> The Netatmo Welcome's 1080p live video is crystal clear, but it the camera has a hard time recognising faces it should know

default, you will receive notifications for each person when they arrive home, but you can turn this off. You can also set a time range for when you want to be notified, say between 3.30- and 4pm when your children usually arrive home from school. Recording parameters for known faces are also set here: you can have an individual recorded always, never, or 'only on arrival'.

The camera's included SD card can hold up to 100 clips and delete them, starting with the oldest video, when it nears capacity. Given that the camera only records when it detects an event, it's unlikely you'll fill the card quickly; but you can always swap in a new card if you do. Just be aware that each time you take a card out, the camera loses its memory of who's who, and you'll need to retrain it to recognise all those faces.

The point of face recognition is obviously to make sure the camera understands who should be in your home and who shouldn't. But the system offers several customisation options for dealing with the latter as well.

You can tell the Netatmo Welcome to always record unknown faces or only when no one is home. You can also choose to record and/or be notified of motion detection 'never', 'always' or 'only when nobody is home'.

The camera's live-feed screen is similar to that of other home security cameras. A video window sits on top of a timeline of motion and face events. Pressing an event takes you to video of the incident. Live video is exceptionally clear with no fish-eye distortion in either day or night modes. There's no digital zoom feature, though, so you can't hone in on specific areas of the panorama. Video playback is crisp and smooth.

Aside from managing profiles and recording settings, the app can be used to turn the camera on and off. You can set a four-digit security code for accessing the on/off switch to ensure unauthorised people can't deactivate your camera.

VERDICT: The Netatmo Welcome gets points for trying to make the home-security experience more reassuring than alarming. Everything from the product's name to the extensive personalisation options seeks to remove – or at least to downplay – the creepy surveillance aspect of home monitoring. Unfortunately, the system's lynchpin – facial recognition – is far from reliable and results in exactly the kind of vague alerts it promises to eliminate.

Add to this the fact that the camera lacks many common home-security camera features – including sound detection, two-way audio, and cloud backup – and it becomes a really tough sell, especially compared to such stronger competitors as the Nest Cam.
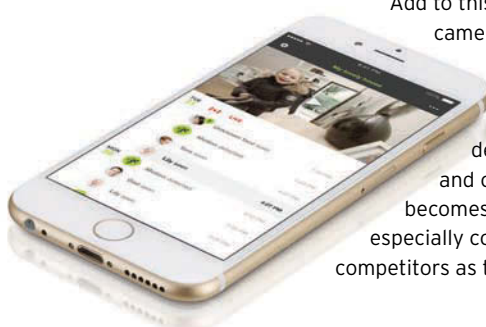
PC ADVISOR
BEST BUY

Y-CAM HOMEMONITOR

From £109 inc VAT • y-cam.com ★★★★☆

The choice of home security cameras is overwhelming, but in the past couple of years what were previously called IP cameras have become much easier to use, and the HomeMonitor system lets you keeping an eye on your kids, pets or your property via an app on your smartphone, just like the Nest Cam.

Cameras that connect to your broadband router are different from CCTV systems, as you can view the live feed and recorded clips remotely on a PC or mobile device.

The HomeMonitor range includes both a weatherproof outdoor camera (the HD Pro at around £190) and an indoor version, called Indoor HDS, which costs around £109. Both models have night vision, so they can capture video round the clock. Since they use infrared LEDs at night, footage is black and white rather than colour.

Both models have a resolution of 1280x720 – that's three times more pixels than older VGA IP cameras, which have a paltry 640x480 resolution. (There is an Indoor VGA model in the HomeMonitor range, but you should avoid it as image quality is poor.) If you'd prefer Full HD 1920x1080, look to the Nest Cam.

The HD Pro has a large detachable antenna that you have to use for Wi-Fi operation. The Indoor HDS has a stubby fixed aerial.

As well as letting you watch the live feed, the HomeMonitor system can record video clips when movement is detected in areas you define. Both the live feed and recorded videos come from 'the cloud' rather than directly from the camera. This is because the video is routed via Y-Cam's servers before you see it.

There are pros and cons to this method. The first drawback is that the live feed isn't actually live. It's roughly 10- to 15 seconds delayed in our experience. That's not usually a problem, though, even if something was happening that required you to take action, since you'll get a motion alert on your smartphone almost the instant motion is first detected.

The second con – if it is a con – is that there's no alternative choice of storage. You can't put a memory card inside the camera as you can with the UCam247, nor can you set a NAS drive as the destination for recordings.

However, for most people this is an advantage as it means the HomeMonitor is completely hassle-free. It saves the past seven days' worth of motion recordings for free in the cloud (where they're a lot safer from deletion or theft), and means you don't have to provide your own SD card or leave a PC or NAS drive running 24/7.

Unfortunately, the recorded quality is lower than the maximum the camera is capable of, as it's optimised for today's broadband
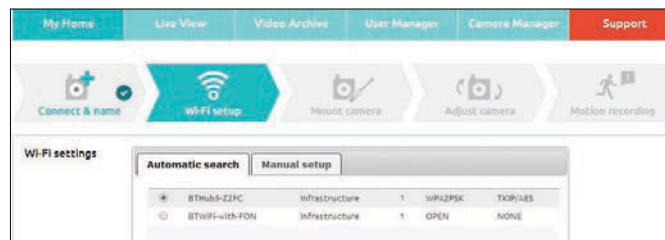
Setup can't be done from your phone, but it's easy via a web browser

speeds. You can download recordings and keep them, but you need to do this before they're more than seven days old.

Another point to note is that unlike Nest's continuous recording, which uploads to the cloud 24/7 (for a monthly subscription cost of £3.89), the HomeMonitor saves only the clips where motion was detected. If it makes a mistake and misses the motion, or cuts off the recording too early (and it does do this from time to time) you may not get to see what you needed to.

Installation

Unlike older cameras, which were a pain to configure and required expert network knowledge if you wanted to watch the video feed over the internet, the HomeMonitor cameras can be set up by anyone.

While you still need to start with a web browser on a laptop or PC, and a network cable connected between the camera and your broadband router, clear instructions make installation easy. Go to the HomeMonitor website, create a free account, type in the camera's unique ID and you'll then see the video feed there on the page.

Assuming you want the camera to connect via Wi-Fi, you select your wireless network, enter the password and then you can relocate the HD Pro to the place you want it to monitor.

Everything is supplied in the box, including a wall-mounting bracket through which the wires run. This does mean drilling a hole in your wall, but unless you already have a handily placed outdoor socket, you'll have to do this anyway. The HD Pro supports PoE (power over ethernet) which is unlikely to be useful unless you're installing the camera at your business premises since most UK homes aren't wired up for PoE.

The final step is to choose the camera's settings, such as defining one or two motion detection zones and a schedule for motion detection. For outdoor use, it makes sense to leave it on permanently, but for indoor monitoring, you might want to enable recording only when you're not at home.
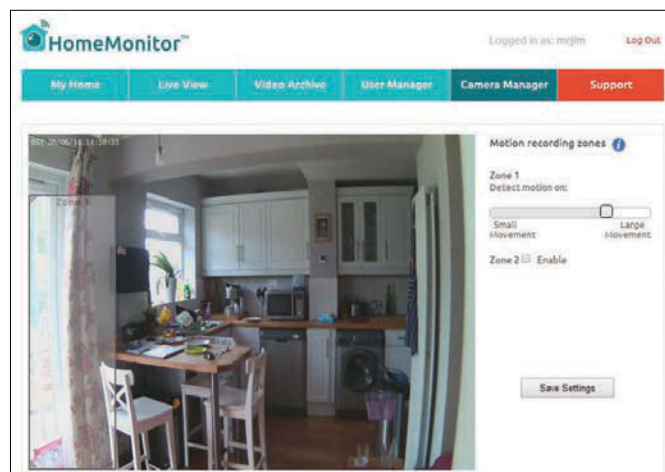
You can create multiple zones for motion detection, plus sensitivity for each

PC ADVISOR TEST CENTRE
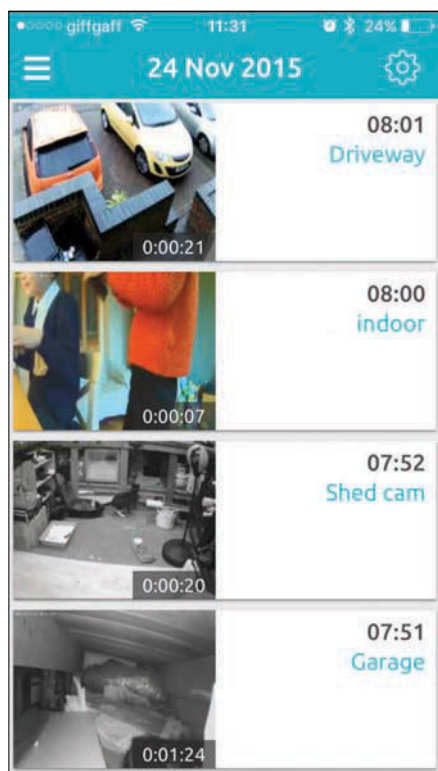
There's no 'daily digest' feature, but it's easy to scroll through the day's recorded clips
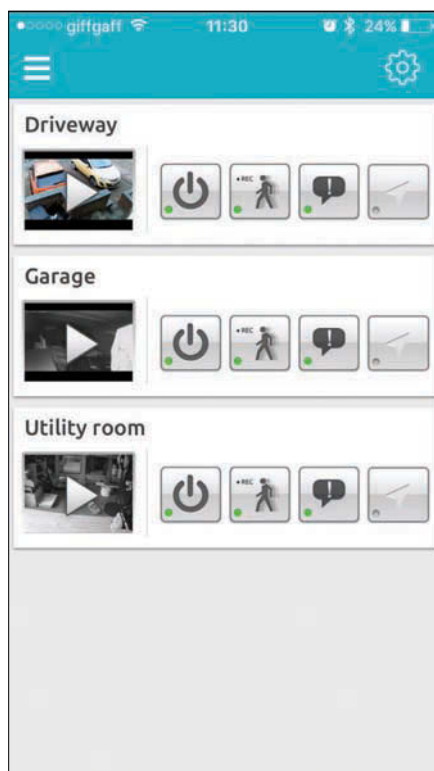
You can enable cameras, recording, alerts and location recording from the app

Apps and website

Y-cam has added a few new features in a recent update. One is geofencing which can be enabled or disabled for each camera. With it enabled, your camera will start watching out for motion when you leave and turn off recording when you return. You have to enable the feature on your phone when you're at home or in the physical location where the camera is installed as it uses your phone's GPS. The second is on-demand recording which provides a record button on the live feed view so you can capture what's going on right then.

You can log in to your account on the HomeMonitor website to watch the live streams and play recorded clips, but there are also apps available for iOS, Android, Kindle Fire tablets and even Windows Phone 8 – a platform rarely supported by anything, let alone IP cameras. There's also an app for Roku streaming boxes. The website and apps have a similar look and feel, and they're very easy to use. Taking the iPhone app as an example, the main screen shows the list of cameras with three buttons next to each. Tapping on the video thumbnail starts the live stream (there's reasonably good quality audio on the cameras, too), and the buttons let you toggle the camera on and off, enable and disable motion recording, and choose whether or not to receive motion alerts for that camera.

Swiping right brings up a list of the past seven days, and you can tap a day to see the recordings for that day. Each recording clearly shows the time, camera name and duration of the clip, so if you have multiple cameras, it's easy to see which one recorded the clip.

Image quality

Image quality is pretty good, and virtually identical for both indoor and outdoor models. The wide angle of view means you can see plenty in the frame, and the frame rate is surprisingly smooth. It does lack some detail compared with the higher-resolution Nest Cam and UCam247-HD1080, and we hope that Y-cam will add a 1080p camera to the range soon.

Colours are accurate during the day, and there's enough detail to easily recognise faces and car registration plates. That's as long as they're fairly close to the camera, of course.

At night, there's less detail to be had, and it's harder to recognise faces because of the infrared lighting. Number plates tend to reflect the light, too, meaning that they're not readable, but these are both issues faced by all cameras which use infrared for night vision.

There's no difference in video quality whether you're watching over Wi-Fi or out and about with a 3G or 4G connection. Just be careful you don't burn through your monthly data allowance by watching too much video on a mobile connection.

VERDICT: As a package, the Y-cam HomeMonitor is the best we've seen to date. Image quality could be better (the range needs a 1080p camera), but it's the ease of setup and clearly laid out apps and website which makes it so good. The Nest Cam has better image quality, but the app is flaky and playback performance isn't as good. Plus, Nest Aware costs quite a lot per month for the subscription, without which there's no recording at all. The HomeMonitor cameras are far from the cheapest around, with no subscription costs, they are still good value. The indoor version – the HomeMonitor HDS – is available on Amazon for just £109. That really is money well spent. ⊠

WHAT'S THE DIFFERENCE BETWEEN THE DARK WEB AND THE DEEP WEB?

Matt Egan reveals everything you need to know about the hidden internet

T he UK government has launched a dedicated cybercrime unit to tackle the Dark Web, but what is it? Here we explore the internet's hidden recesses.

What is the Dark Web?

The Dark Web is a term that refers to a collection of websites that are publicly visible, but hide the IP addresses of the servers that run them. Thus they can be visited by any web user, but it is very difficult to work out who is behind the sites. And you cannot find these sites using search engines.

Almost all sites on the Dark Web hide their identity using the Tor encryption tool, which can be used to hide your identity and spoof your location. When a website is run through Tor it has much the same effect.

Indeed, it multiplies the effect. To visit a site on the Dark Web that is using Tor encryption, the web user needs to be using Tor. Just as the end user's IP is bounced through several layers of encryption to appear to be at another IP address on the Tor network, so is that of the website. So there are several layers of magnitude more secrecy than the already secret act of using Tor to visit a website on the open internet – for both parties.

Not all Dark Web sites use Tor. Some use similar services such as I2P – indeed, the all new Silk Road Reloaded uses this service. But the principle remains the same. The visitor has to use the same encryption tool as the site and know where to find the site, in order to type in the URL and visit.

Infamous examples of Dark Web sites include the Silk Road and its offspring. The Silk Road was (and maybe still is) a website for the buying and selling of recreational drugs. But there are legitimate uses for the Dark Web. People operating within closed, totalitarian societies can use the it to communicate with the outside world.

And given recent revelations about US- and UK government snooping on web use, you may feel it is sensible to take your communication on to the Dark Web.

Dark Web or Deep Web

Although all of these terms tend to be used interchangeably, they don't refer to exactly the same thing. An element of nuance is required. The 'Deep Web' refers to all web pages that search engines cannot find. Thus the 'Deep Web' includes the 'Dark Web', but also includes all user databases, webmail pages, registration-required web forums, and pages behind pay walls. There are huge numbers of such pages, and most exist for mundane reasons.

We at *PC Advisor*, for example, have a staging version of our website that is blocked from being indexed by search engines, so we can check stories before we set them live. Thus for every page publicly available on this website (and there are literally millions), there is another on the Deep Web. The content management system into which this article is being typed is on the Deep Web. So that is another page for every page that is on the live site. Meanwhile our work intranet is hidden from search engines, and requires

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Almost all sites on the Dark Web hide their identity using the Tor encryption tool, which can be used to hide your identity and spoof your location
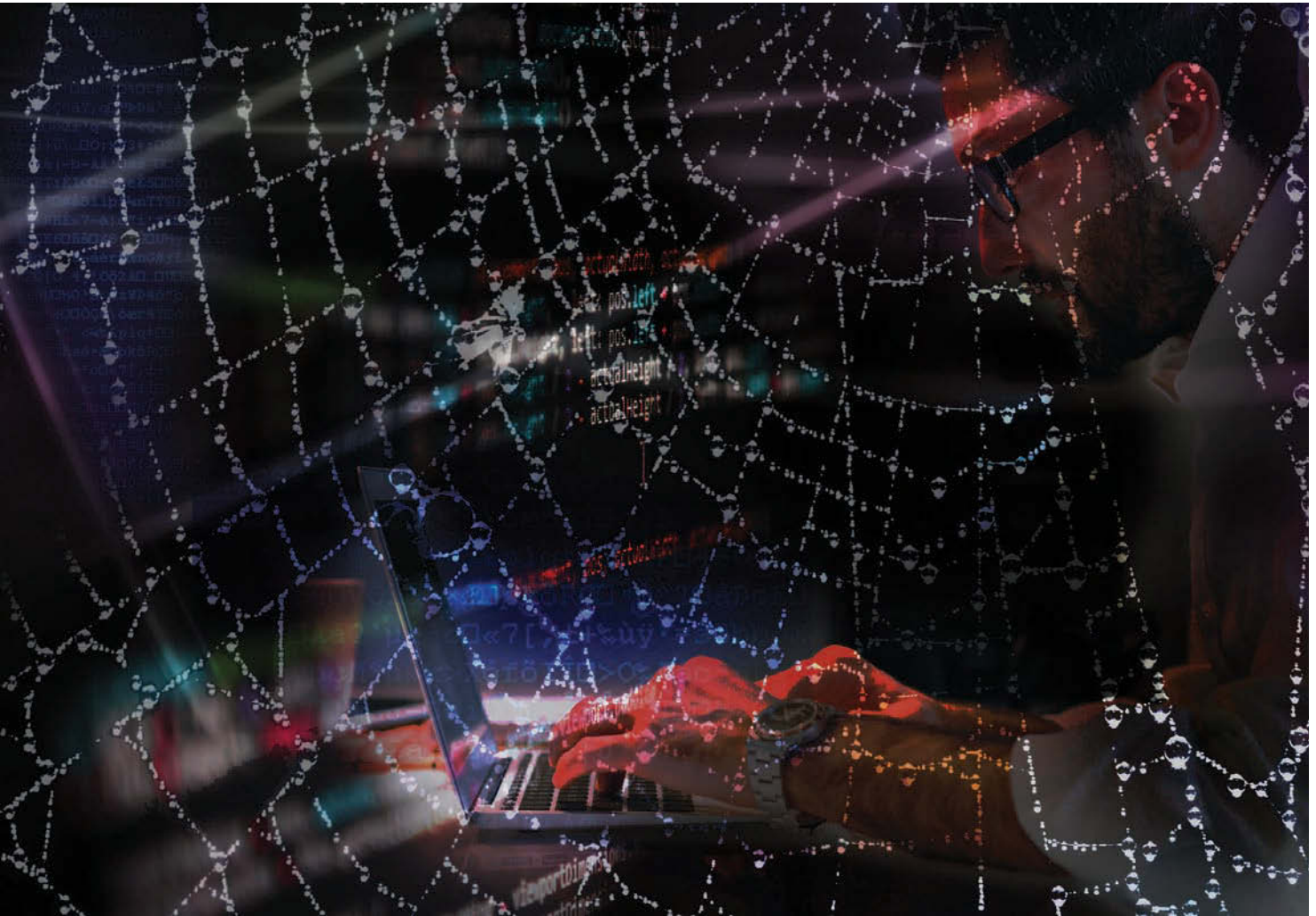
a password. It has been live for nearly 20 years, so there are plenty of pages there.

Use an online bank account? The password-protected bits are on the Deep Web. And when you consider how many pages just one Gmail account will create, you understand the sheer size of the Deep Web.

This scale is why newspapers and mainstream news outlets regularly trot out scare stories about '90 percent of the internet' consisting of the Dark Web. They are confusing the generally dodgy Dark Web with the much bigger and generally more benign Deep Web. Mixing up the act of deliberately hiding things, with that of keeping pages away from search engines for reasons of security or user experience.

The Dark Internet

Confusingly, 'Dark Internet' is also a term that's sometimes used to describe further examples of networks, databases or even websites that cannot be reached over the internet. In this case, either for technical reasons, or because the properties contain niche information that few people will want, or in some cases because the data is private.

A basic rule of thumb is that the phrases 'Dark Web' or 'Deep Web' are typically used by tabloid newspapers to refer to dangerous secret online worlds, the 'Dark Internet' is a boring place where scientists store raw data for research. The Deep Web is a catch-all term for all web pages that are not indexed for search, the others refer to specific things.

How to access the Dark Web

Technically, this is not a difficult process. You simply need to install and use Tor. Go to torproject.org and download the Tor Browser Bundle, which contains all the required tools. Run the downloaded file, choose an extraction location, then open the folder and click Start Tor Browser. That's it. The Vidalia Control Panel will automatically handle the randomised network setup and, when Tor is ready, the browser will open; just close it again to disconnect from the network.

Depending on what you intend to do on the Dark Web, some users recommend placing tape over your laptop's webcam to prevent prying eyes watching you. A tinfoil hat is also an option.

The difficult thing is knowing where to look. There, reader, we leave you to your own devices and wish you good luck and safe surfing. And a warning before you go any further. Once you get into the Dark Web, you will be able to access those sites to which the tabloids refer. This means that you could be a click away from sites selling drugs and guns, and – frankly – even worse things.

Aggregation sites such as Reddit offer lists of links, as do several Wikis, including thehiddenwiki.org – a list that offers access to some very bad places. Have a quick look by all means, but please don't take our linking to it as an endorsement.

And do heed our warning: this article is intended as a guide to what is the Dark Web – not an endorsement or encouragement for you to start behaving in illegal or immoral behaviour. ⊠

The phrases 'Dark Web' or 'Deep Web' are used by tabloid newspapers to refer to dangerous secret online worlds, the 'Dark Internet' is where scientists store raw data for research

10 Microsoft Office 2016 features you'll love

Collaboration is the key to Microsoft's still-ubiquitous productivity suite. Ian Paul reports
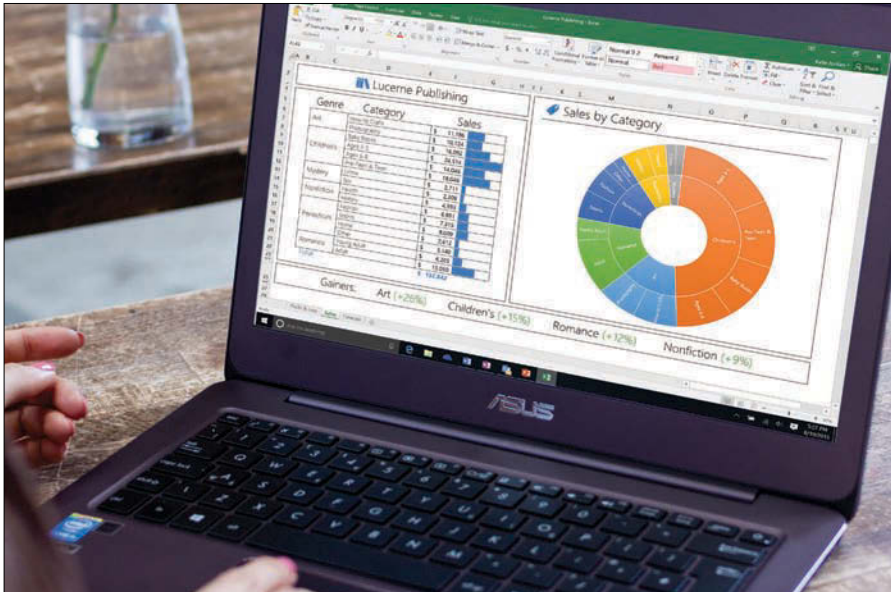
To the casual user, the applications that make up Office 2016 – Word, Excel, PowerPoint and Outlook are the anchor tenants, of course, rounded out by OneNote, Access and Publisher – will be indistinguishable from their predecessors. But make no mistake about it; Microsoft's reboot of its flagship software suite is a major update, offering a wealth of collaboration capabilities that integrate more tightly with SharePoint and OneDrive than before. The many tweaks and enhancements across the board can be confusing though, and we peek under the hood to highlight the features that matter most.

1 Real-time coauthoring

The capability to work on the same document simultaneously with your colleagues comes to the desktop version of the productivity suite in Office 2016. Workmates can work on the same Word documents and PowerPoint presentations that are saved on SharePoint or OneDrive without overwriting each other's changes. Note that the 'real-time typing' feature in which you can see your colleagues working on the same document is only available in Word for now. PowerPoint supports coauthoring, but without real-time typing.
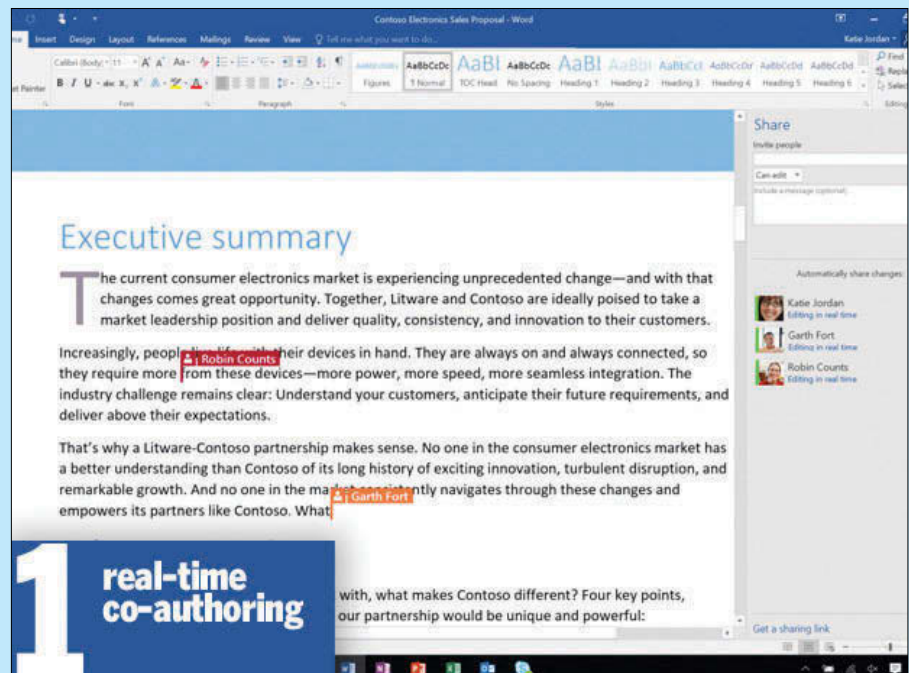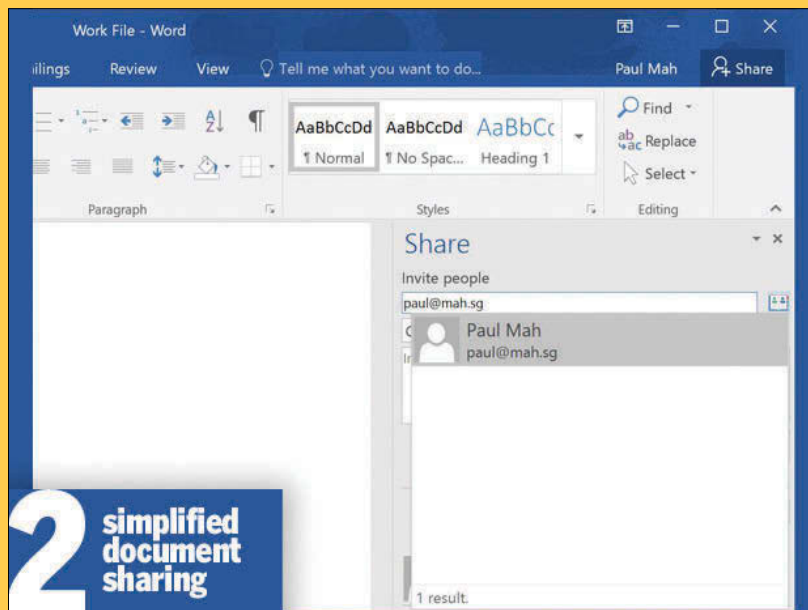
2 Simplified document sharing

You can now easily share your documents in Office 2016, courtesy of a prominent 'Share' button in the Ribbon. Available across Word, Excel and PowerPoint, this lets you share access to a document to your team members, and serves as a one-stop location to review access permissions or see who is currently working on the document. As with coauthoring, the files must be saved in either SharePoint or OneDrive in order to be shared.

3 Send large files with OneDrive

While the ability to share large files by sending a private URL link to friends and colleagues is hardly a novel feature, the fact that it is now integrated into Office 365 should be of interest from a productivity point of view. File attachments added to an email message in Outlook are automatically converted into a link that recipients can click on to download, assuming they are already synced to an OneDrive account or SharePoint folder. You can also specify whether they can be edited, or opt to attach the file as a local file copy instead, too.
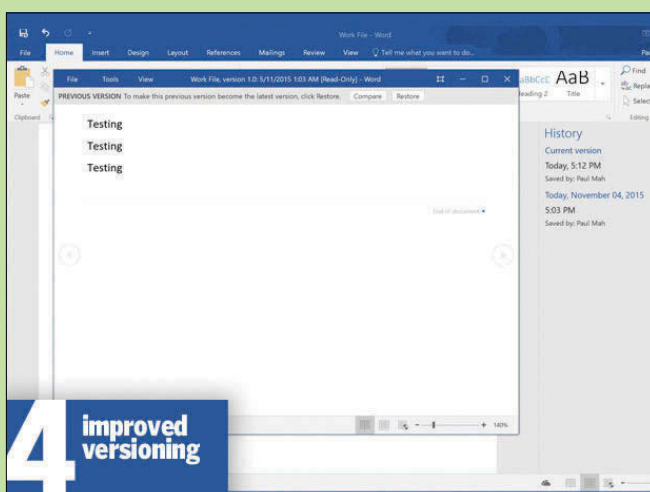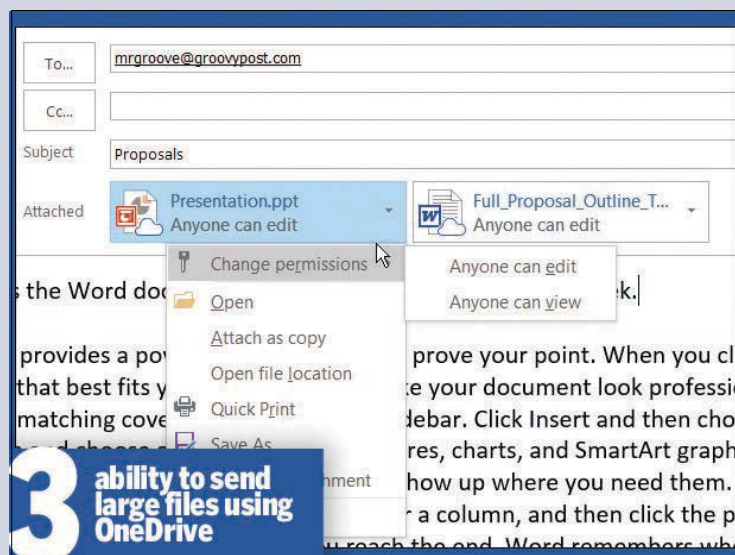
4 Improved versioning

Made a mistake while editing a document, or accidentally deleted a chunk of content some time back and only just realised it? For files saved on SharePoint and OneDrive for Business (This doesn't work for regular OneDrive at the moment), Office 2016 allows you to view historical versions of Office files directly from within Word, Excel and PowerPoint. Simply go to File > History to see a list of all prior versions in the History pane, click on the desired version, and load it in a separate window. The feature is also useful for reviewing earlier drafts of documents when editing a file or collaborating with others.
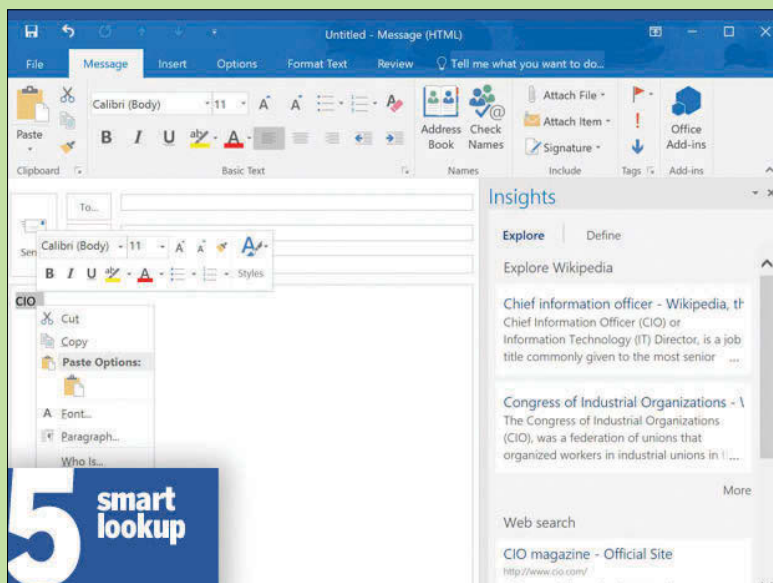
5 Smart Lookup

Smart Lookup is a new feature that allows you to highlight a word and selecting 'Smart Lookup' from the context menu (right-click on the mouse) to quickly pull up some related information without having to leave your Office app. Use it to look up the definition of a new word, or to gain some context with an unfamiliar term. Results are Bing-powered and will load into an 'Insights' pane within your current authoring environment.

6 Support for Office Groups 365 in Outlook

A new feature called Groups in Outlook 2016 was quietly added with the launch of Office 2016. While relatively little mention was made of it, the new tool offers a superior way to eliminate traditional distribution lists or messy email chains for collaboration within teams and project groups – both at work or at home. You can create a group for new colleagues or friends to join, with each group having its own shared inbox, calendar, file repository and even integrated OneNote notes.
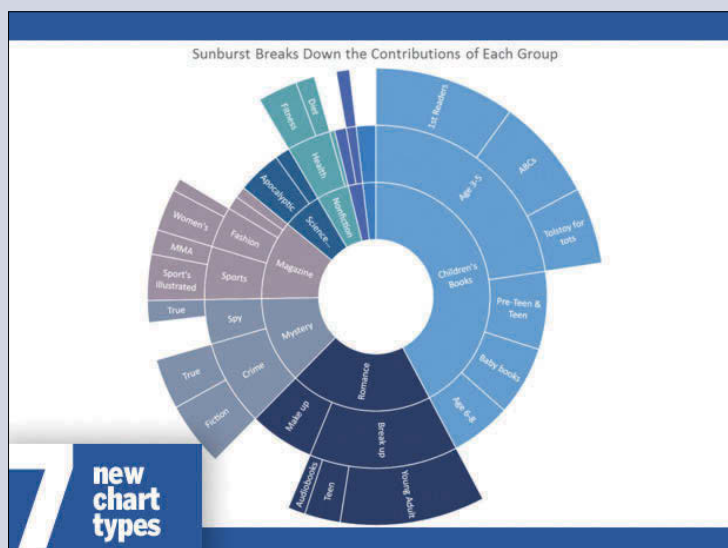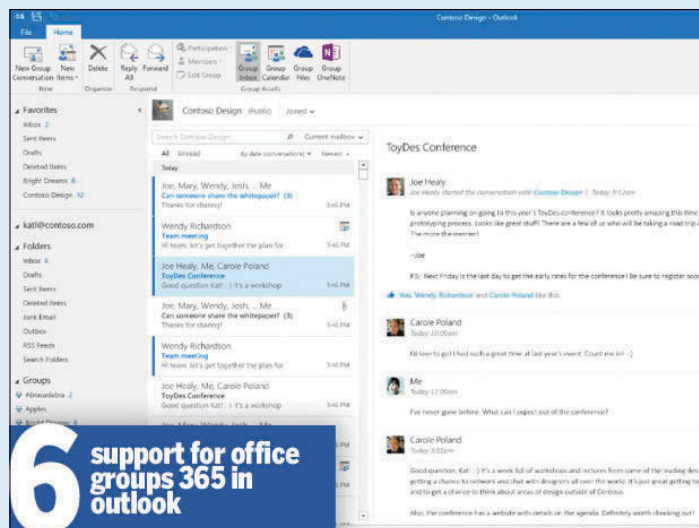
New Excel chart types
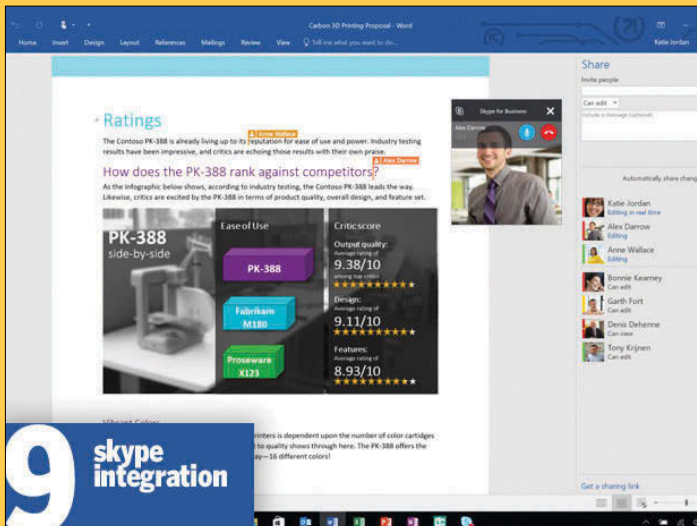
7 For those who felt the selection of charts in Office was getting a tad boring, Microsoft has added a bunch of new charts that should help users to do a better job when it comes to visualising financial or hierarchical data. Use the following new charts on Word, Excel and PowerPoint: Treemap, Waterfall, Pareto, Histogram, Box and Whisker, and Sunburst.

8 One-click Forecasting

Excel ninjas will appreciate the ability to create a forecast from available data. This new capability is embedded within Excel's charts feature, making it easy to derive quick and dirty projections with the click of a mouse. Microsoft says the feature uses the industry standard Exponential Smoothing (ETS) algorithm to give reliable forecasting data. For employers, insisting that staffers use this feature could help cut down on shenanigans in which forecasts gets too 'creative'.

9 Skype integration

One of the tighter integration that Office 2016 offers is how the various desktop apps now let users jump into a Skype call from within Word of Excel. Tap into the various capabilities in Skype such as Instant Messaging (IM), voice or video calls, as well as screen sharing without having to break out of your current workflow or to launch the Skype client.

10 Stronger cross-device support

Finally, there is no question that Office 2016 represents a key step forward a new world of cross-platform support with tighter integration across both platforms and apps than before. Importantly, there is no feeling that any of these Office apps are abandoned or even 'left behind' in terms of the development curve.

Of course, many of the capabilities highlighted here do require a subscription to Office 365 to either use, or to derive the maximum benefit from. There is no question that the new productivity and collaboration enhancements are real though, which is as good an argument as any to consider Office 365. ⊠

GET MORE OUT

ANDR

MARSH

Learn how to mute notifications, change your default web browser, customise the Quick Settings tray, and more on Android Marshmallow

By **Nick Mediati**

A ndroid 6.0 Marshmallow is here, and if you're lucky enough to have it on your phone, you've probably already spent plenty of time poking around and exploring every nook and cranny of Google's latest mobile OS. To help you out, though, we've complied this list of 10 tips for getting more out of Marshmallow.

OF OID MALLOW WITH THESE TIPS & TRICKS

1 Take control of notifications with Do Not Disturb

2 Get to Android Marshmallow's hidden file manager

3 Use Bluetooth to improve your GPS location accuracy

4 Make sense of Marshmallow's new memory manager

5 Change your default web browser and phone apps

6 Turn off heads-up 'peeking' notifications for individual apps

7 Delete apps without leaving the home screen

8 Turn off Doze Mode for specific apps

9 Customise Android Marshmallow's Quick Settings tray

10 Manage app permissions in Marshmallow

1

TAKE CONTROL OF NOTIFICATIONS WITH MARSHMALLOW'S DO NOT DISTURB FEATURE
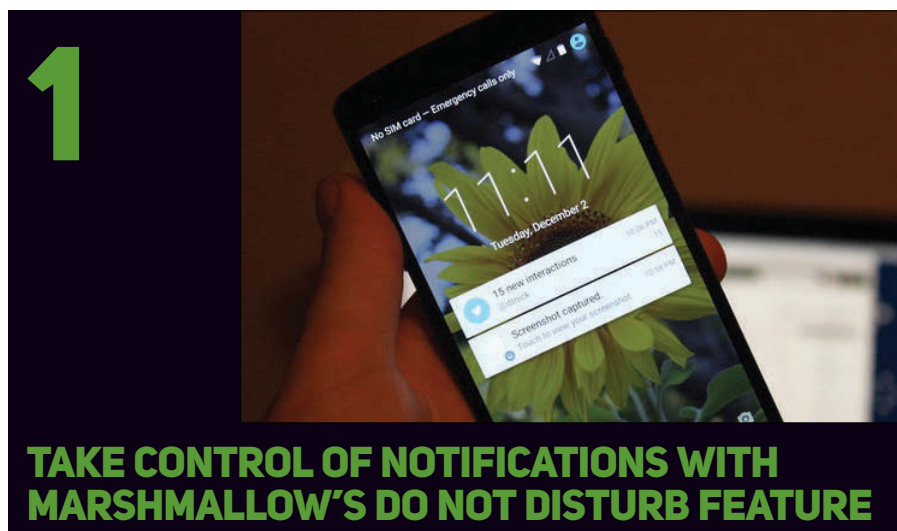
Marshmallow further bolsters Android's existing notification muting features thanks to an enhanced Do Not Disturb feature.

In Android 5.0 Lollipop, Google added some new features that made it easier to silence unwanted notifications while you're asleep or at work, for example. Android 6.0 Marshmallow builds on Lollipop's Priority Notifications and Downtime features, and gives these notification management tools a new umbrella name: Do Not Disturb. Let's take a look at what these expanded notification-silencing features can do.

Turn on Do Not Disturb at any time

Marshmallow lets you mute notifications at any time with just a tap. Pull down the Notifications drawer, then swipe down again to get to the Quick Settings tray. Tap Do not disturb, then choose the sorts of alerts you want to receive while do not disturb is active. You can choose to continue receiving notifications for alarms or priority notifications, or you can opt for total silence.

Finally, choose whether you want to have Do Not Disturb stay on until you say otherwise (Until you turn this off) or for a set period of time (For one hour, by default). If you choose the latter option, use the '+' and '-' buttons to set how long you want Do Not Disturb to be active.
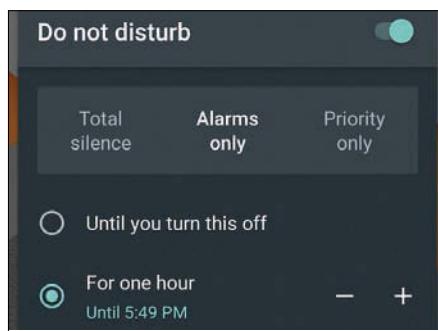
Priority interruptions

Android Lollipop introduced the concept of 'priority notifications'. These notifications rise to the top of the notifications screen, and you can choose to continue receiving auditory or vibration alerts for these notifications even when you have all other notifications muted.

To choose which notifications you'd like to treat as priority notifications, head on over to your phone's Settings app, then tap Sound and notification – a one-stop shop of sorts for all things related to notifications and alert sounds. Next, tap Do not disturb, then tap Priority only allows. From this

screen, you can choose to limit the sorts of notifications you'll be alerted to.

First, choose whether you want to give priority to notifications for reminders and calendar events. (The option to silence alarms is greyed out for whatever reason.)

Next, review the priority notifications options for Messages and Phone calls. Set your priority preferences by tapping either 'Messages' or 'Calls'. When you do, a menu pops open with four options:

- **From anyone:** This option allows all notifications through, regardless of who is trying to reach you.
- **From contacts only:** Notifications alerting you to calls or messages from people listed in your Contacts app will get priority status.
- **From starred contacts only:** This setting gives priority to notifications that pertain only to those marked as favourites in the Contacts app. To mark someone as a favourite, go to the Contacts app, tap that person's name, then tap the star icon in the upper right corner.
- **None :** No call or message notifications will receive priority status.

Once you choose your desired settings for calls and messages, choose whether you want notifications from repeat callers to gain priority by toggling the 'Repeat callers' slider to the On position. When this is switched on,

Do Not Disturb is a swipe and a tap away in Android Marshmallow

With priority notifications, you can choose to let certain notifications through while Do Not Disturb is turned on
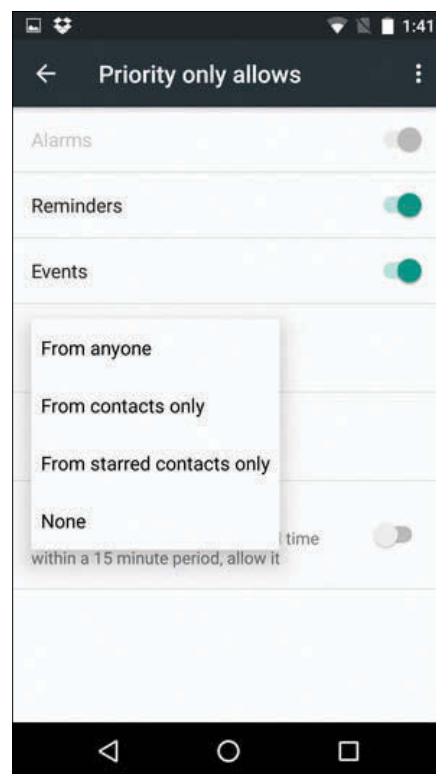
You can continue receiving phone call and message notifications from some people, even when Do Not Disturb is turned on

you'll receive a notification if someone calls you a second time within a 15-minute period, regardless of whether notifications from that person receive priority status.

Downtime

If you want to allow all notification alerts through most of the time, but want to limit alerts during certain hours, Downtime is for you. During Downtime hours, you'll only be alerted to priority interruptions; your phone will receive all other notifications silently. They'll be there, waiting for you when you wake up, but your phone will not light up the screen, make a noise, or vibrate.

If you want to use Downtime, you first need to choose the days of the week and times you want to set as notification quiet hours. Go to Settings > Sound and notification > Do not disturb > Automatic rules. Android Marshmallow provides presets you can use for weekends and weeknights, and a preset option for managing notifications during calendar events.

Start by tapping any of these three options – for the sake of this tutorial, we'll tap Weekend. Next, toggle the on/off switch to the 'on' position. Select the Days you want the preset to apply to, then set a Start time and End time. Finally, select the kinds of alerts you'd like to allow through. You can choose between Alarms only (allows alarms to sound but silences all other notifications), Priority only (allows only priority notifications), or Total silence (which mutes all notifications).
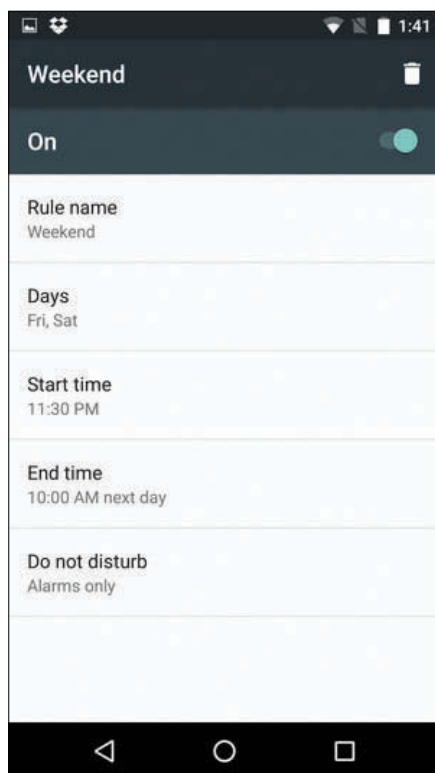
Setting quiet hours for weekends
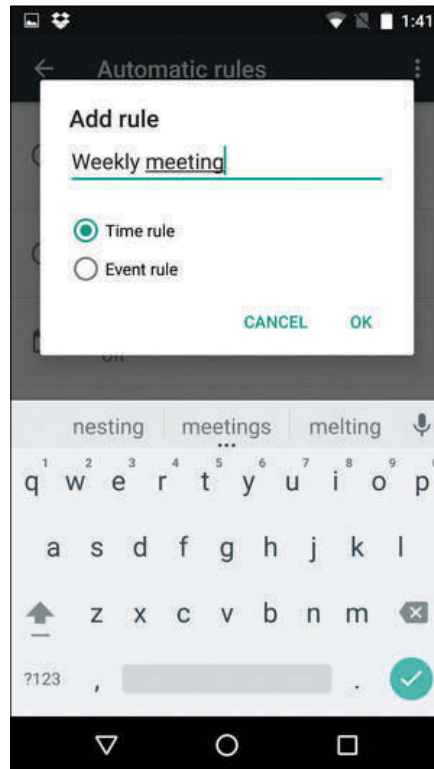
You can set up your own rules if you want. This might come in handy if you don't want to be disturbed while you're at work

Take a peek at the Event preset as well, and choose whether you want to silence notifications from going off during events listed on your calendar – useful for preventing your phone from going off in the middle of a staff meetings. Switch the rule on, select the calendar and reply status you want it to use, then choose what kind of notifications you want to receive.

You can create additional rules for notifications as well. For example, you can set one to allow only priority notifications while you're at the office. Tap Add rule, enter a name, choose whether you want a Time

App notifications

Android Marshmallow, like Lollipop before it, also allows you to choose to block apps
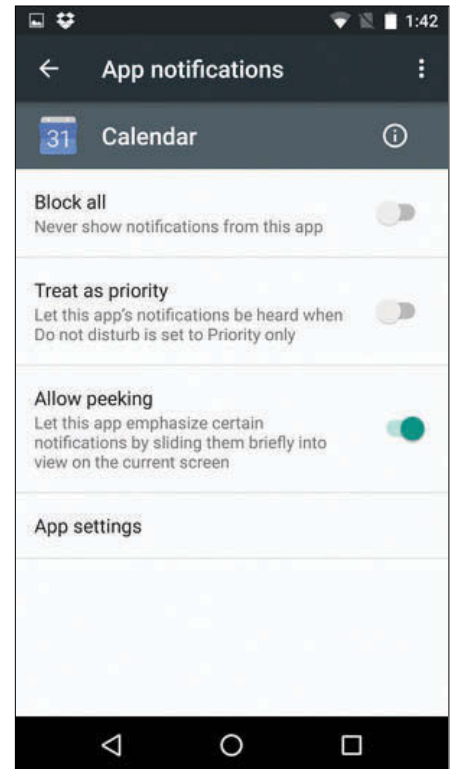
You can bestow priority status on to notifications from any app. You can also silence all notifications from a given app

from sending notifications entirely, or to mark notifications from certain apps as priority notifications.

First, head back to Settings > Sound & notification. Next, scroll to the bottom and tap App notifications, then tap on the app for which you want to adjust notification settings. Toggle the Block all slider to the 'on' position to stop receiving notifications from that app. Toggle the Treat as Priority slider to 'on' if you want notifications from that app to be considered Priority notifications.

While you're here, you can toggle whether you want to view the larger 'heads-up'

Marshmallow builds on Lollipop's Priority Notifications and Downtime features, and gives these notification management tools a new umbrella name: Do Not Disturb

rule (you enter specific times and dates) or an Event rule (one based on calendar events), then tap OK. At this point, you can set up your new rule. You can delete a rule by tapping its name, then tapping the trash can icon in the upper right corner. You can also choose to temporarily stop observing a rule by toggling the on/off switch to 'off'.

notifications for the app in question using the Allow peeking setting.

You can also get to this screen any time an app's notification appears by pressing and holding on the notification until you see the little info button (it looks like a lowercase 'i' in a circle) appear. Tap on that, and you'll go straight to the notification settings for that app.

Once you're done, exit the Settings app and enjoy your newfound mastery of Android Marshmallow's notification system.

2
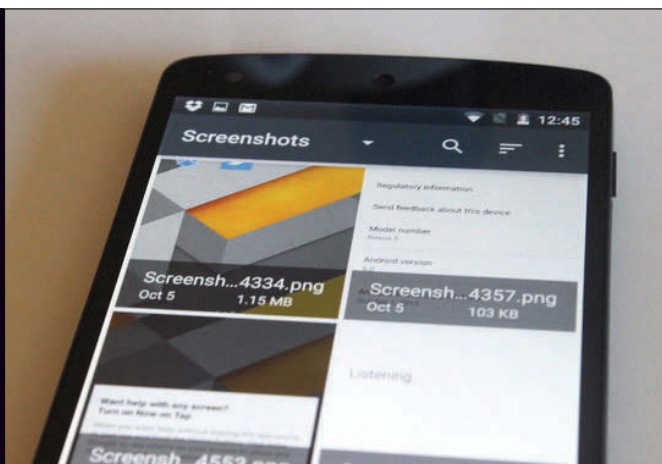
HOW TO GET ANDROID MARSHMALLOW'S HIDDEN FILE MANAGER

Did you know you can browse your phone's file system on Android Marshmallow without downloading a separate app?

If you, like us, are accustomed to micromanaging your files on your computer, the lack of a built-in file manager on smartphones can be a serious pain point. Why do we have to jump from app to app to manage files? Why can't we do it all from one place? Sure, you can find various file management apps on Google Play, but Android itself never shipped with one. Until now, anyway.

Android 6 Marshmallow includes a hidden file manager that's switched off by default,

but you can switch it on quickly and easily if you know where to look.

Go to the Settings app then tap Storage & USB (it's under the Device subheading). Scroll to the bottom of the resulting screen then tap Explore: Just like that, you'll be taken to a file manager that lets you get at just about any file on your phone.

The file manager is pretty basic, but it'll feel pretty familiar to anyone who's used the OS X Finder or Windows Explorer: Tap a folder to view its contents, tap a file to view it, press and hold a file icon to get at additional options (Delete, Share, and so on).

A basic search feature makes it a little easier to find just the file you're looking for. You can also change the sort order for items (tap the View button – the three horizontal lines in the toolbar) or switch between the Grid view and List view (tap the Options menu button – the three dots in the upper-right corner).

Unfortunately, the file manager is a little difficult to get to – it's actually part of the Settings app, so you can't add it to the homescreen, for example. Ideally, the file manager would be a separate app that you can optionally show in the app drawer, but as it stands, Android Marshmallow's file manager is a welcome new addition.

3

USE BLUETOOTH TO IMPROVE GPS ACCURACY ON ANDROID MARSHMALLOW

Improve your phone's location accuracy with the flip of a switch. GPS by itself generally does a pretty good job at pinpointing your location, but it isn't perfect. Sometimes, you'll get a good GPS satellite signal, but other times, your phone's GPS won't be able to show you exactly where you are.

Android 6's file manager

Grid View gives you larger icons and file previews than List view
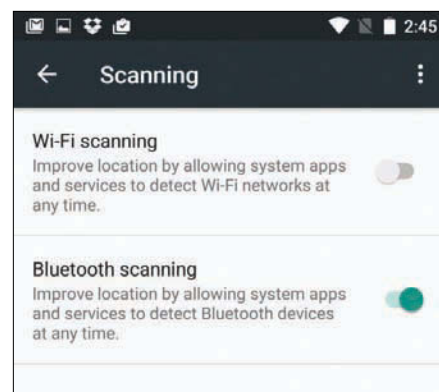
Switch on Bluetooth scanning to use Bluetooth to help find your location

Use the High Accuracy location mode to use every location triangulation methods
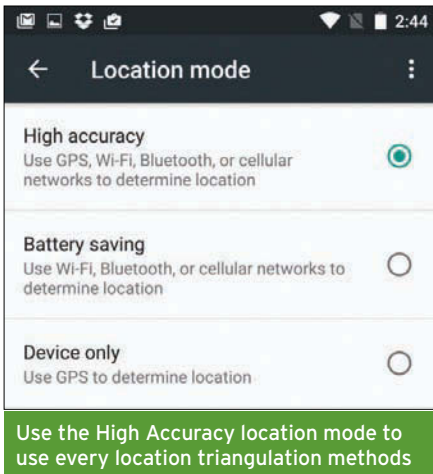
Android can bolster your GPS capabilities by using nearby Wi-Fi access points and cell towers to better triangulate your location, and with Android Marshmallow, you can use Bluetooth to improve your location accuracy further still.

To do so, open the Settings app and go to Location, Tap the Options menu button – those three dots in the upper right corner – and select Scanning from the menu. Finally, slide the Bluetooth scanning toggle to the on position if it isn't already.

Now, make sure that your phone is actually set to take advantage of Bluetooth scanning. Return to Settings > Location, tap Mode, then tap High accuracy. This will let your phone use a combination of GPS signal, as well as Wi-Fi, Bluetooth, and cell tower triangulation, to more precisely pinpoint your location.

4

HOW TO MAKE SENSE OF ANDROID'S MEMORY MANAGER
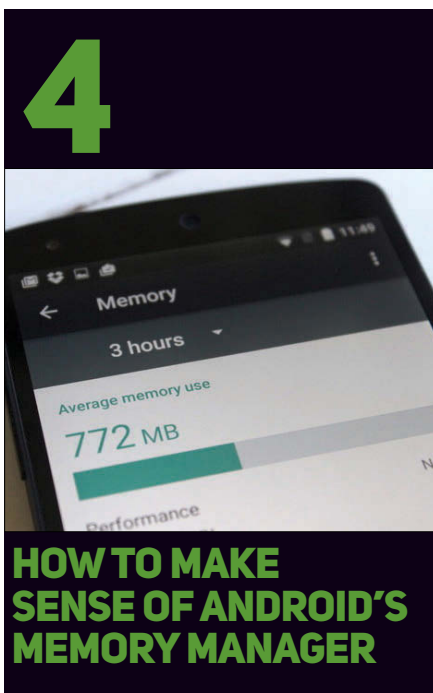
Android's new memory manager makes it easier than ever to make sense of how your Android phone is using its RAM.
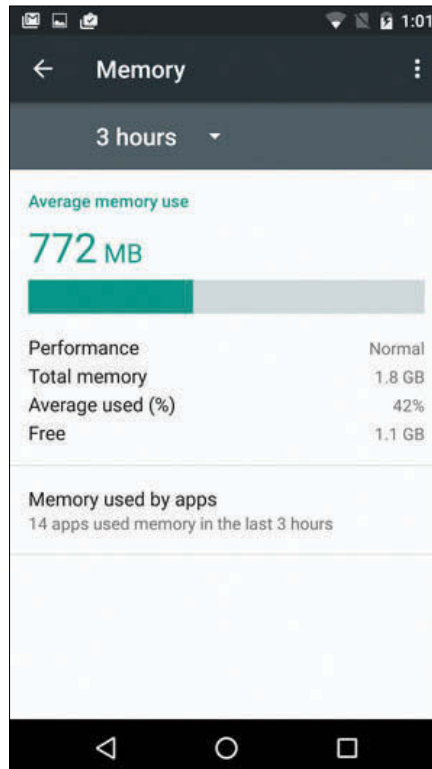
Android Marshmallow features a handy at-a-glance overview of how your device is using its memory

Compared to iOS, Android has always given users more information about the underlying guts of the operating system. In Android Marshmallow, Google takes this one step further with a new memory manager that gives you all sorts of information on how your phone is using its RAM. Here's how to navigate it.

Go to the Settings app, then tap Memory. Here you'll get an at-a-glance overview of your phone's memory usage for the past three hours. It includes your phone's average total memory use for all apps and Android system components, your phone's total memory, how much free memory remains, and the percent of memory currently in use. It also gives an indicator of how memory usage on your device has impacted its performance over that time.

If you'd like to get an idea of how your phone is managing its memory over a longer period of time, tap the downward-facing arrow next to '3 hours' and pick a different time span. You can view general memory usage stats for the past three-, six-, 12- or 24 hours.

You can, of course, take a closer look at how individual apps are using memory. Tap Memory used by apps to get a breakdown of how much memory each running app is eating up. Again, it defaults to showing memory usage for the past three hours, but you can view stats for three, six, 12, and 24 hours, just as you can with the general
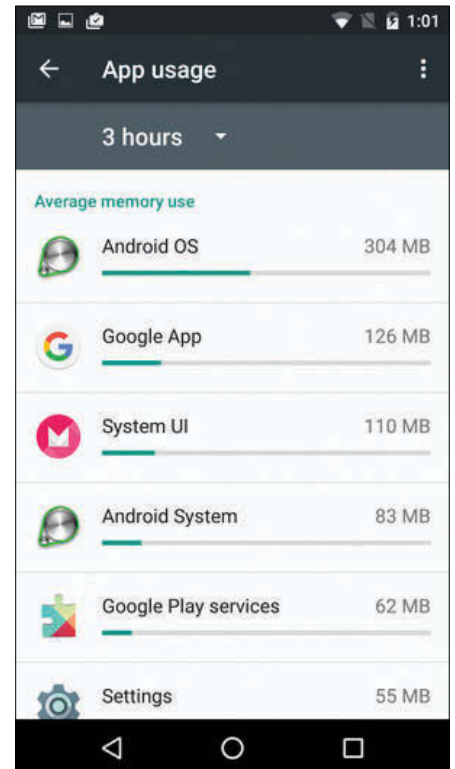
If you are wondering which app is using up the most memory, the App usage screen will tell you

overview. Tap the name of any app to get more nitty-gritty details, and to force-stop a problematic app (tap the Options menu – the three dots in the upper right – then tap Force stop).

Admittedly, a lot of this information is purely for geeks – if you have no interest in how your phone uses its RAM and it isn't giving you any trouble, you probably won't ever have to peek in the Memory panel. But it's good to know that that information is there if you need it.
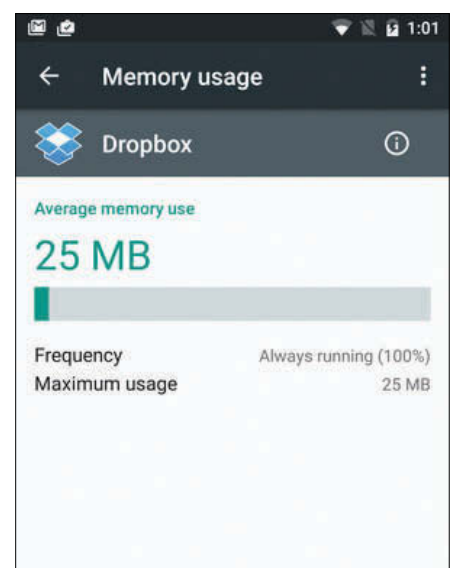
Tap an app name to get more information

5
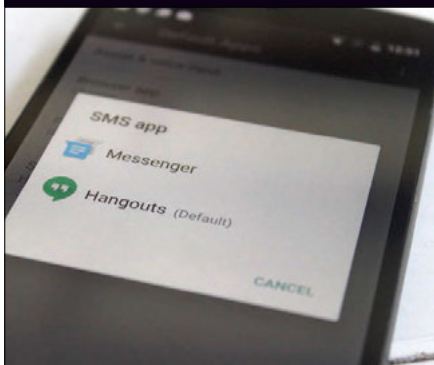
HOW TO CHANGE YOUR DEFAULT BROWSER AND PHONE APPS IN ANDROID MARSHMALLOW

Android M makes it simpler to change your default browser, phone, and SMS apps. The ability to set a different default app for various functions – such as browsing the web or checking email – isn't new in Android Marshmallow. But prior to Marshmallow, you had to dig through Settings > Apps, clear your default app setting, then go back to
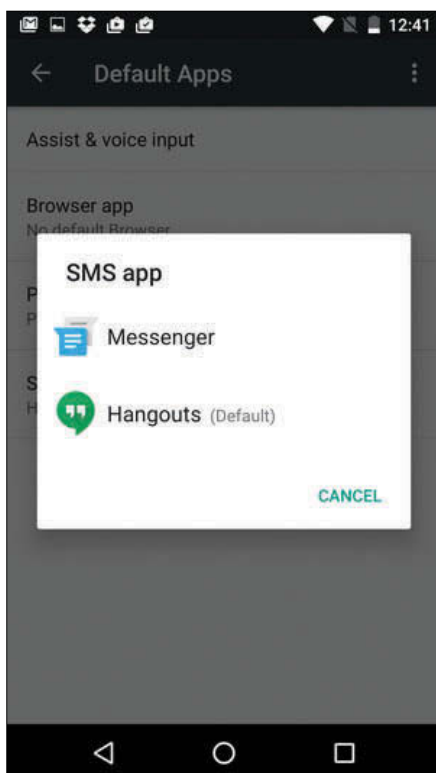
Choosing a new SMS app

the homescreen and reselect a new default. Marshmallow adds a new one-stop shop that makes it easier than ever to change your default app of choice at any time. Here's where to find it, and what it can do.

Go to the Settings app, then tap Apps. Next, tap the Gear icon in the upper-right corner, then tap Default Apps. Here you can set a new default phone app, web browser, messaging (SMS) app, and assistant (Assist and voice input) app. For all but Assist and voice input, tap the function for which you want a new default app, then select the app you'd like to use from the list.

For Assist and voice input, you'll be taken to a separate screen that provides some additional options for this feature. To change this app, tap Assist and voice input, then tap Assist app on the subsequent screen and select a default app as before.

It'd be great to see Google take the default apps feature up a notch in a future release of Android. Right now, the Default Apps pane is somewhat hidden in the Settings app, and it can only change the default assistant, phone, browser, and messaging apps. If you want to set a new default email app, for instance, you're more or less out of luck. Still, it's better than nothing, and it gives Google something to build off of in the future.

6
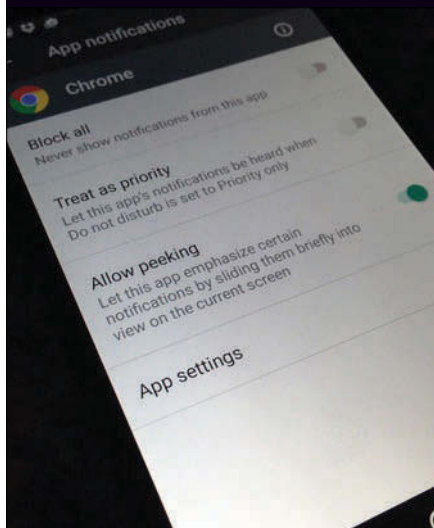
HOW TO TURN OFF HEADS-UP NOTIFICATIONS IN ANDROID MARSHMALLOW
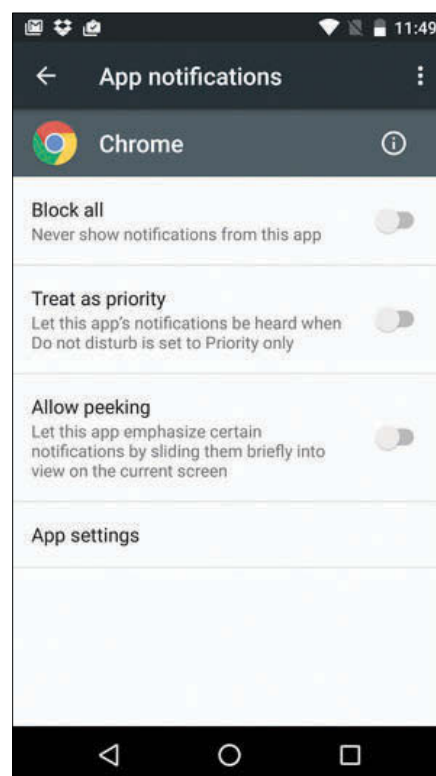
Slide Allow peeking to the Off position to disable heads-up notifications for a given app

Not a fan of Lollipop's heads-up notifications? Android Marshmallow lets you turn them off for individual apps.

Android Lollipop introduced a new type of notification that Google calls 'heads-up notifications'. Instead of showing a scrolling message in the status bar – as was the case with notifications in earlier versions of Android – Lollipop's heads-up notifications slide down over the status bar and provide a larger, more visible notification message.

The change was controversial. These new notifications may look prettier and be easier to read than the old ones, but some users have bemoaned the change since the new notifications obscured other onscreen content. Heads-up notifications are still around in Android Marshmallow, but you can now switch off heads-up notifications on a per-app basis.

Open the Settings app, then tap Sound and notification. Tap App notifications, then tap the name of the app you no longer want to see notifications for. Next, toggle the Allow peeking switch to the Off position – it'll turn from blue to grey. Just like that, you will no longer receive heads-up notifications for that app.

Unfortunately, Marshmallow doesn't appear to have a system-wide setting for these sorts of notifications, but at the very least, you can reduce the number of heads-up notifications you see.

7

DELETE APPS WITHOUT LEAVING THE HOME SCREEN

No more digging through the Settings to delete an app – now you can remove it with a quick drag and drop.

In prior versions of Android, you had to go poke around in Settings in order to delete an app from your device. In Android Marshmallow, Google has simplified the process to the point where you just need to drag and drop an icon.

Find the app you want to uninstall, either in the app drawer or on the homescreen. Press and hold that app's icon for a moment until your phone buzzes. If you can delete the app, a trash can icon with the word 'Uninstall' next to it will appear at the top of your screen.

Drag the icon to the trash can to delete the app. Android will ask you to confirm that you want to delete the app: tap OK, and that app will be deleted from your device.

You can't delete apps that come bundled with Android – you can only delete apps you downloaded separately from Google Play. You can, however, remove apps from the homescreen using this same trick. But instead of dragging the app's icon to the Uninstall icon, drag it to the Remove icon – a large X – instead.
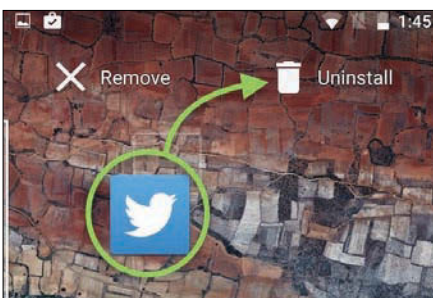
8
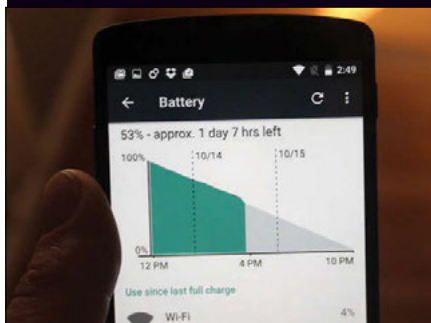
HOW TO TURN OFF DOZE MODE FOR SPECIFIC APPS IN ANDROID MARSHMALLOW

Doze mode will help save your phone's battery, but you can easily switch it off if you want. New in Android Marshmallow is a feature called 'Doze mode', which prevents certain tasks from running if you're phone's been sitting idle for a while. The idea here is to save battery life by reducing power draw while you aren't using your phone.

But if you have a particular app that you want to leave running unchecked, no matter
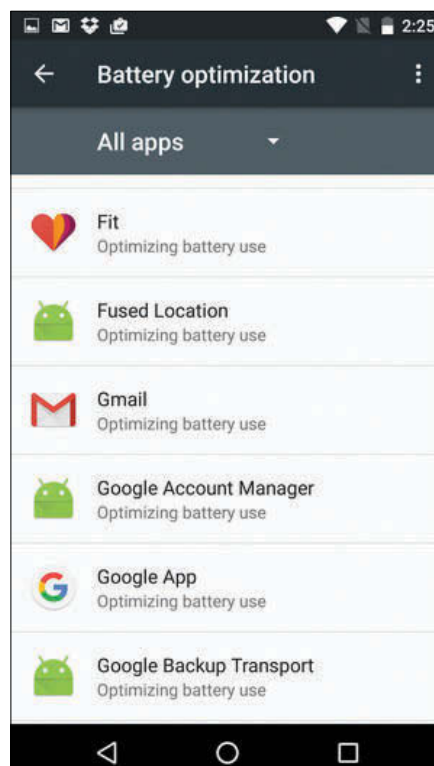
Stop apps from running in the background
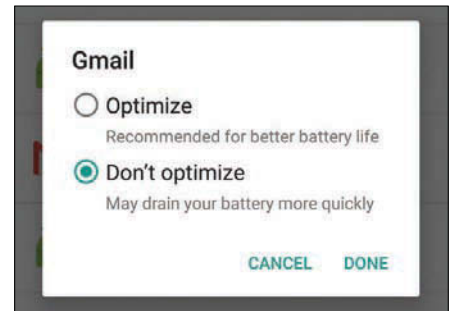
Switching off Doze mode for the Gmail app

what, you can disable Doze mode for that app. Here's how to do it.

Open the Settings app and tap Battery. Tap the Options menu button (the three dots in the upper right), then tap Battery optimization. Tap the downward-pointing arrow, then tap All apps from the menu that appears. Next, tap the name of the app for which you want to switch off Doze mode, and in the box that appears, tap Don't Optimize. Once you're done, tap Done.

You can turn Doze mode back on at any time – simply repeat the above process, but when prompted, tap Optimize instead.

9
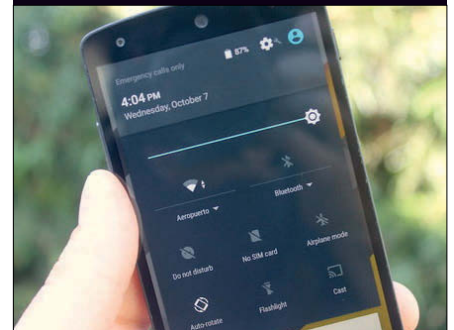
HOW TO CUSTOMISE ANDROID MARSHMALLOW'S QUICK SETTINGS TRAY

A hidden feature in Android Marshmallow lets you add, remove, and rearrange shortcuts in the Quick Settings tray. Here's how to use it.

The Quick Settings tray isn't new in Marshmallow, but tucked away in the bowels of Google's new mobile OS is a hidden feature that lets you customise what appears there. It's a useful tool if you don't want certain items you'll never use taking up space in the Quick Settings tray, or if you want to rearrange the icons so that the shortcuts you use most often are in an easy-
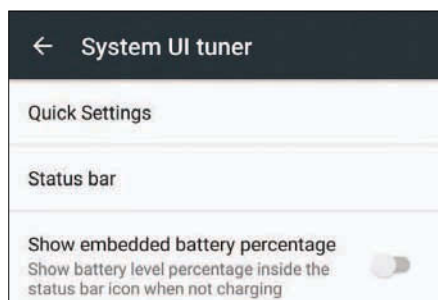
Android Marshmallow's hidden System UI Tuner settings screen

to-reach place. It takes a little trickery to get to this feature, but it's easy enough to get to.

First, you need to enable Android Marshmallow's System UI Tuner. To do so, first swipe down from the top of the screen to open the notification drawer, then swipe down again to open the Quick Settings tray (or, swipe down with two fingers). Next, press and hold the gear icon in the upper right corner for a few seconds until the gear icon starts spinning. Release your finger, and you'll be presented with a message telling you that System UI Tuner is up and running.

Open the Settings app if it isn't already, scroll down, then tap System UI Tuner under the System subheading. If this is your first time using System UI Tuner, you'll get a message warning you that System UI Tuner features are 'experimental' and 'may change, break, or disappear in future releases'. Read and dismiss the message, then tap Quick Settings. At this point, you can rearrange, remove, or add items to the Quick Settings tray quickly and easily. To rearrange items, simply drag them around. If you want to remove an icon, drag it from its location in the Quick Settings tray to the Delete icon. If you want to add (or re-add) an item, tap Add tile, then tap the name of the setting you want quick access to.

The Quick Settings customisation tool works reasonably well, but it's still a little rough around the edges. That said, it works well enough that we can see Google building it out a little more and making it easier to access.
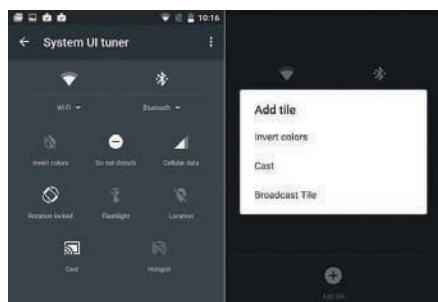
You can quickly and easily add, remove, or rearrange shortcuts that appear in the Quick Settings tray

10
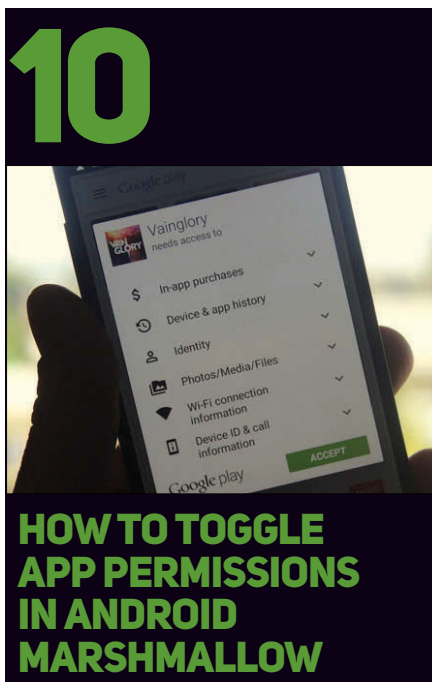
HOW TO TOGGLE APP PERMISSIONS IN ANDROID MARSHMALLOW

In Android Marshmallow, Google has totally revamped how you manage app permissions: it's a change that's apparent every time you download an app from Google Play. You'll get a new, more detailed permissions notice, but it goes much deeper than that.

Don't want Chrome to be able to see your location? Not a problem. With Android Marshmallow, You can pick and choose what sorts of information and which system resources any given app can access. Here's how to find and use this new feature.

Open the Settings app, then tap Apps under the Device subheading. Next, tap the Gear icon in the upper-right corner, and then tap App permissions on the following screen. From here, you'll get a list of all the sensors, information, and other features of your phone that apps can access. Tap on any of these to see which apps can get at that particular feature. For the sake of this tutorial, we'll take a look and see which apps can access my phone's camera and snap photos, so we'll tap Camera.

To revoke an app's permission, tap the toggle switch to flip it to the Off position – it'll switch from blue-green to gray. To re-grant permission, simply tap the toggle switch again. By default, you'll only see apps here, not Android system services. To see which system services have permission to access something, tap the Options button – those three dots in the upper right – then tap Show system.

If you prefer to view permissions on a per-app basis rather than a per-feature basis, go to Settings > Apps, tap an app's name, then tap App permissions. From there, you'll be able to see what features and information that particular app can access, and toggle permissions accordingly.
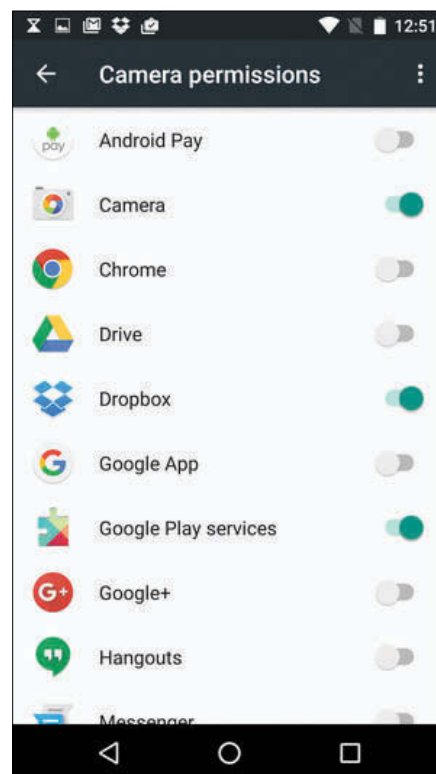
Here you can see every app that can use your phone's camera

When you download an app from Google Play, you'll get a message that explains the permissions an app requires, just as it has before, but it'll now provide a little more information on the privacy implications. Unfortunately, most Android apps still don't specifically say how they're going to use your information up front, but Android Marshmallow's improved permissions features do make it easier to make sense of what had been a confusing state of affairs.

Note that some applications haven't been adjusted to account for Android's new pick-and-choose permission model. You can still toggle individual permissions, but it could cause those apps to behave weirdly. If you have an app that isn't working right, you may want to revisit its permissions. ⊠
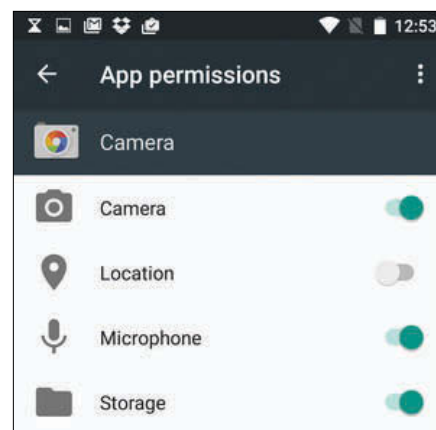
Viewing permissions on a per-app basis

Use an Android Wear device with an iPhone

Jim Martin reveals that the Android Wear app allows you to use Android Wear with your iPhone

Smartwatches are becoming more prevalent, but it's still rare to see anyone wearing one. If you own an iPhone, you might think your only choice is an Apple Watch, but you'd be wrong. You can download the free Android Wear app and pair a Wear smartwatch. However, serious limitations in the way these devices talk to each other means you'll want to think twice.

Which models are supported?

There's no restriction on which smartwatches work with the iPhone, but your device will need to be running the latest version of Android Wear - 1.3 or later.

You'll also need an iPhone 5 or newer running iOS 8.2 or later. You can go to android.com/wear/check on your phone to verify if it's compatible. Bear in mind that if you have a watch with

firmware that's too old, you'll have to update it using an Android phone as it won't pair with an iPhone.

Pairing and setup

Once you've installed Android Wear from the App Store, the process is the same as on an Android phone. You'll need to turn on Bluetooth and enter the pairing code shown on the watch on your iPhone when prompted in the app. You'll be asked to give permission for location services, notifications, access to your calendar and more. It's unwise to disable these as your watch isn't going to be much use without them. You'll also need to opt into Google Now and - obviously - sign in to your Google account.

When the process is finished and any firmware updates installed, you can go to the settings section in the app and

choose which apps can send notifications to your watch, including 'rich Gmail notifications'.

Disadvantages compared to Apple Watch

While there's some integration with iOS, it's not deep enough to be useful. The Apple Watch has access to areas of iOS that Android Wear doesn't, so you're not going to be able to use Siri or other features. Worse still, you won't be able to use some Android Wear features. Not only is there a more limited selection of watch faces (we were using the LG Watch Urbane with an iPhone 6 Plus), but you can't install apps. That's right – it's not possible to install any extra apps on your Wear smartwatch when used with an iPhone.

Notifications on Android Wear (and the Apple Watch) are generally a bit limited. Thanks to APIs, app makers can add actions you can use to respond to notifications. But there's more bad news in the Wear-iPhone partnership: those custom actions don't exist. You can merely dismiss or block the notification.

Things are little better with Google's own apps, as you can archive, delete or reply to Gmails. Replies are dictated using Google Now, or you can draw on the screen to search for a suitable emoji.

But the more you use your watch, the more limitations you'll find. While you can use Google Now to do many things, from translating words to converting weights and measures, you can't say "give me directions to the British Library" and get turn directions on your wrist. And when you set reminders, these don't appear in the iOS Reminders app. Similarly, your agenda is only what's in your Google calendar, not your Apple/iCloud account.

Apple is never going to allow third parties to have the same feature set as the Apple Watch, nor integration with its own services including iMessage. For this reason, and the fact an Android Wear watch will be bereft of extra apps, it will always be a better partner for an Android phone.

The bottom line is that unless you just happen to have a Wear device lying around, please don't go out and buy one thinking you'll have a great experience when you pair it with your iPhone. ⌧

LG WATCH URBANE

Build your own Windows app with App Studio

Microsoft has just made it easy for anyone to build their own app. Martyn Casserly explains how
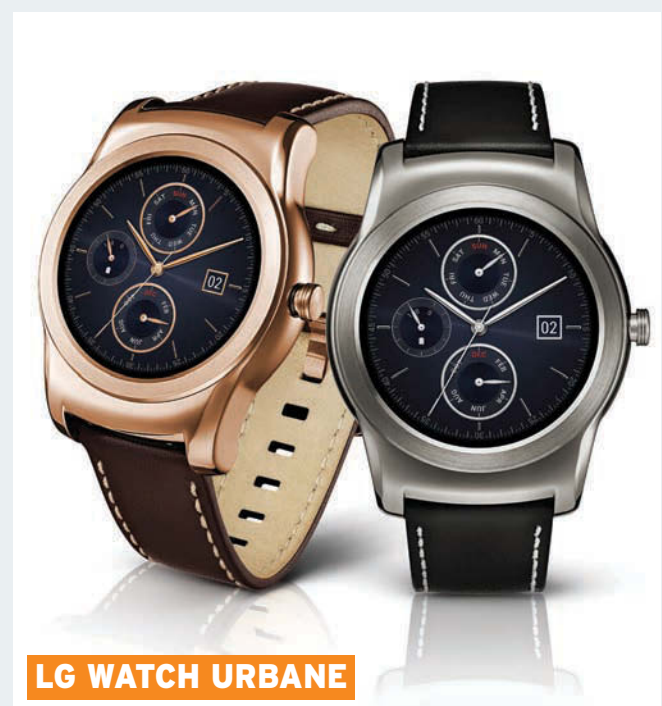
Windows 10 may well have the most comprehensive software library of any platform in the world, but a trip to the new Windows Store can leave you with a very different picture. Even with the recent addition of Universal Apps that run on the desktop and mobile, developers still seem shy of writing dedicated apps for the Store. Well, now you can do it yourself, for free, and you don't even need to know anything about coding. In this feature we'll show you how, using the Windows App Studio.

Getting started

The Windows App Studio is a web-based system that doesn't require the installation of any software on your machine. The online nature also means that you can access your app from any PC with an internet connection. Head over to the Windows App Studio site (tinyurl.com/nyrhLxd), and after you've logged in with your Microsoft account you'll be able to make use of the free tools and get started straight away.

The first page you'll see after you've logged in is entitled Start New, and has options at the top for creating apps specifically for Windows 10 and 8.1. You'll want to make sure the Windows 10 one is selected.

The main pane has options for the different types of template that you can use to build the app. There

are two types available: App or Content. The first is used to create web apps, which are a redirect to an existing web page or site. Alternatively, Content apps are actual mobile apps, that draw data from various sources and display it in a manner that you specify.

Within Content there are two three options to choose between: Empty App, My Favourite Band and My App. Empty is just as

it says, a blank shell into which you add sections and sources, then determine the general look and feel of the app. If this sounds a little too much like hard work then the two others are Predefined templates that still give you control over the content, but use previously generated apps as a starting point. Select one of these to begin.

Using the Editing Menu

You'll first be asked to name your app, and then you'll be taken to the editing menu. This is the main engine house of the App Studio. On the right is a preview of the app as it will appear on a mobile device, to see a desktop version just click on the full screen option below the panel. Any change you make to the app won't automatically appear in the preview, instead you'll need to click the Refresh button for them to be presented.

The bulk of the screen is taken up by the blue boxes that represent the content that will appear in your app. Each one can be edited by clicking on the Pen icon in the bottom-left corner of each box. To add a new section, double-click on the relevant grey box below, then add the required information to connect it to the source of your data. For example, you can add a Podcast or Blog feed by selecting the RSS box then entering the URL and clicking Confirm.

Some of the details can look a little scary at first, as adding a Facebook or Twitter feed both require Creating a new API. Thankfully this isn't complicated, and clicking on the How to Create section that appears next to the request for an API brings up detailed and understandable instructions.

For the most part, Microsoft has done a good job of making the process as easy as possible, but the very nature of creating an app means that you'll need to read the instructions to really understand what's going on. On the Editing Menu, you'll see a list of options across the top of the page – My Project, How To, Start New, and so on. It's worth clicking on How To, as it takes you step by step through the whole process.
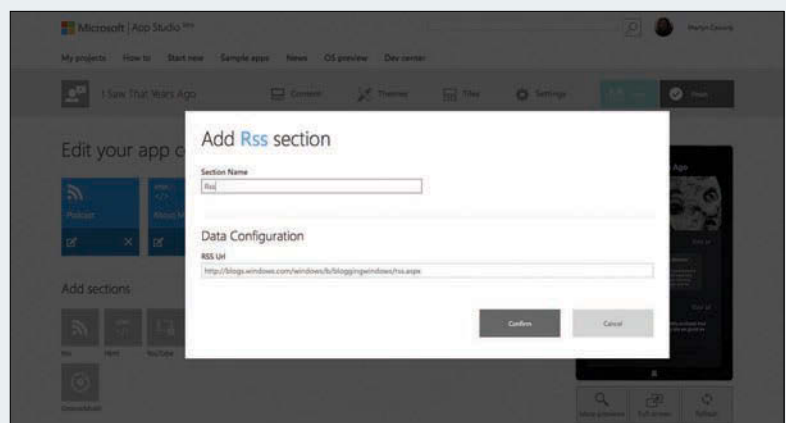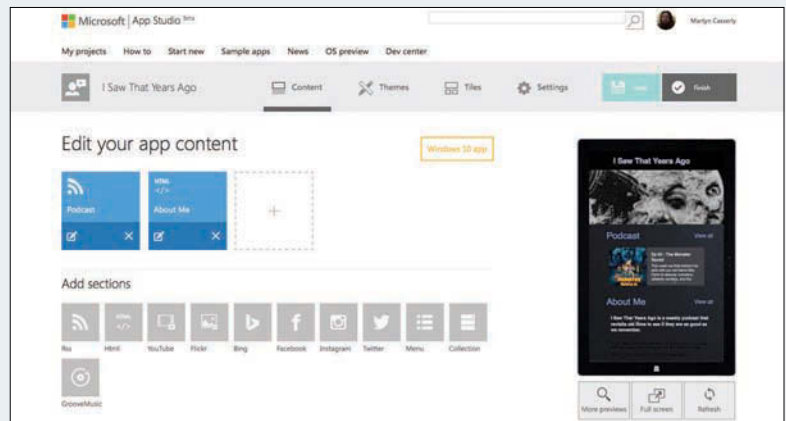
Finishing up

Once you're happy with the app, and have checked to see that each section works in the way you intended, all that's left to do is click the Finish button on the Editing Menu. This takes you to the Generation page where you can decide on how you want to download the app.

There are three choices; Installable Package, which allows you to directly install the app on any Windows device; Publish Package, that gives you everything you need to submit it to the Windows Store; and Source Code package, for the more code-savvy users that want to edit the app in Visual Studio.

That's it. Your Windows app is now complete and you are an app developer. ⊠
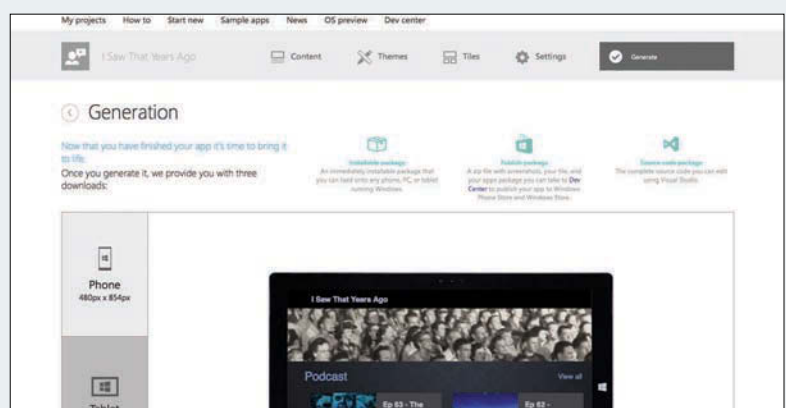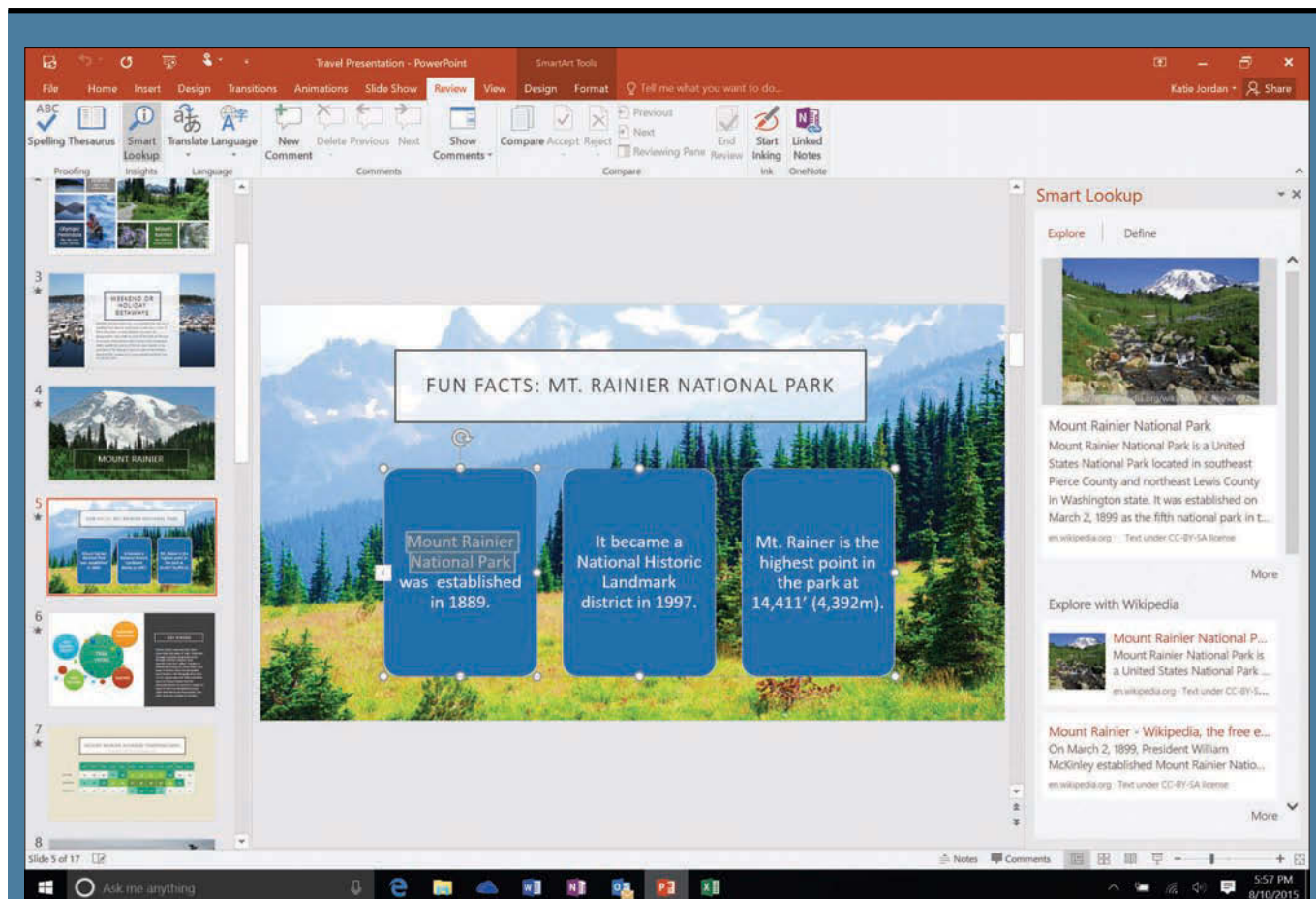
# Put together a PowerPoint presentation

Ian Paul's 16 PowerPoint keyboard shortcuts will help you create a professional-looking slideshow

Of all the programs in Microsoft Office, PowerPoint is easily the one that requires the most artful usage. Novelists might use Word, but you'd never be able to tell that based on what you read on the page. The difference between a good presentation and a bad one, however, has a lot to do with what you see on that PowerPoint deck, and how it was put together.

We can't help you find that perfect cartoon or meme to kick off your talk, but we can help you work more efficiently and easily within PowerPoint. Take a look at these 16 helpful keyboard shortcuts to gain more control over PowerPoint – and how polished your presentation looks for next week's meeting.

These shortcuts will work with PowerPoint 2013 and 2016:

1. Keyboard access to the ribbon: Just like Excel and Word, one of the key shortcuts to know is how to activate Key Tips. Pressing the Alt key will label each menu item with a letter, allowing you to navigate the program from your keyboard.

2. F6: Move clockwise between panes in Normal view.

3. F4: Repeat the last action.

4. Shift + F6: Move counterclockwise between panes.

5. Alt + Shift + Left Arrow: Move one paragraph up.

6. Alt + Shift + Right Arrow: Move one paragraph down.

7. Alt + Shift + Down Arrow: Move selected paragraphs up.

8. Alt + Shift + Down Arrow: Move selected paragraphs down

9. Ctrl + Shift + >: Increase the font size.

10. Ctrl + Shift + <: Decrease the font size.

11. Ctrl + M: Add a new slide.

12. Alt + Shift + F9: Show/Hide the ruler

13. Shift + F3: Cycle the case for the selected text.

14. Ctrl + Home: Jump to the beginning of the first word in a text container

15. Ctrl + End: Jump to the end of the last word in a text container

16. Alt + Right Arrow: Rotate selected slide object by 15 degrees clockwise (Using the left arrow does the reverse). ⊠
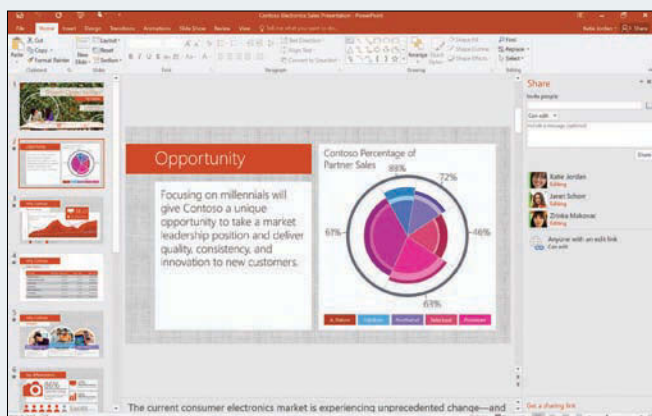
PC ADVISOR DOWNLOADS ZONE

Welcome to the *PC Advisor* Software Downloads Zone

You've probably noticed that there's no cover disc with this month's issue. We've taken the hard decision to remove the disc and move to online downloads.

Most software developers distribute their programs online rather than on CDs or DVDs. And more often than not in the past, developers required *PC Advisor* readers to use online registration, and increasingly demanded that software be downloaded rather than allowing them to be included on the cover disc. So despite there being a disc taped to the cover, there would often be little more than a link to download the software.

For these reasons, we've created a new Downloads Zone on our website. And to make things as easy as possible, we have removed the need for individual codes to download or register each program.

The only code you'll need is **DOWNLOAD1215**, which you can enter at the following page:

pcadvisor.co.uk/magazine/download

Once logged in, you'll be able to browse the software on offer or search for something specific using the search box, or click the Downloads link at the top of each page and browse by category.

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PC ADVISOR TEST CENTRE

PC Advisor's charts rank and rate the best products every month. If you're looking to buy the latest and greatest kit, look no further than our 100-plus reviews

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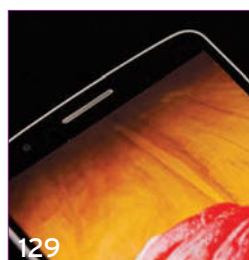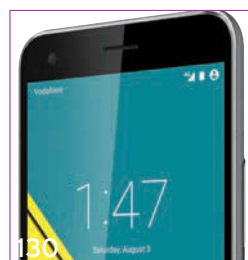
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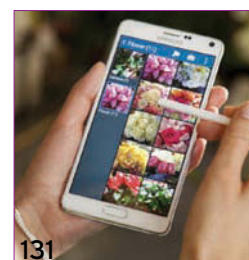

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Prices listed are those quoted by the distributor or manufacturer and include VAT. They are intended only as a guide.

If you're interested in purchasing one of the products reviewed here then please contact the manufacturer or supplier directly, mentioning both *PC Advisor* and the issue in which you saw the product. If it won't supply the product as reviewed, contact us at jim_martin@idg.co.uk.

Manufacturers are under no obligation to feature reviewed products on their websites. Our recommendations are for guidance only.

Star ratings and Gold, Recommended and Best Buy badges are awarded at the time of the original review and given in relation to the market competition at that time.

PC ADVISOR TEST CENTRE

Best laptops	1 Aorus X7 v2	2 Alienware 13	3 Apple MacBook Pro Retina 15in	4 HP EliteBook Folio 1040 G1	5 Apple MacBook Pro Retina 13in
Price	£1,720 inc VAT	£1,100 inc VAT	£1,599 inc VAT	£2,116 inc VAT	£999 inc VAT
Website	Aorus.com	Alienware.co.uk	Apple.com/uk	Hp.com/uk	Apple.com/uk
Build rating	★★★★☆	★★★★⯪	★★★★⯪	★★★★⯪	★★★★⯪
Features rating	★★★★⯪	★★★★☆	★★★★⯪	★★★★⯪	★★★⯪☆
Performance rating	★★★★⯪	★★★★☆	★★★★☆	★★★★⯪	★★★★☆
Value rating	★★★⯪☆	★★★★☆	★★★★☆	★★★☆☆	★★★★☆
Overall rating	★★★★⯪	★★★★⯪	★★★★⯪	★★★★☆	★★★★⯪
Processor	2.4GHz Intel Core i7-4860HQ	2.4GHz Intel Core i7-5500U	2.2GHz Intel Core i7	2.1GHz Intel Core i5-4600U	2.7GHz dual-core Intel Core i5
RAM	16GB DDR3	8GB (2x 4GB) DDR3	16GB DDR3L	8GB DDR3L	8GB LPDDR3
Storage	1TB HDD, 3x 128GB SSD	256GB SSD	256GB SSD	256GB SSD	128GB SSD
Screen size	17.3in matt	13.3in matt	15.4in matt	14in matt	13.3in matt
Screen resolution	1920x1080	1920x1080	2880x1800	1920x1080	2560x1600
Graphics	2x nVidia GeForce GTX 860M	nVidia GeForce GTX 860M	Intel Iris Pro Graphics	Intel HD Graphics 4400	Intel Iris Graphics 6100
Video memory	8GB	2GB	N/A	N/A	N/A
Wireless	802.11a/b/g/n/ac	802.11ac	802.11a/b/g/n/ac	802.11a/b/g/ac	802.11a/b/g/n/ac
Ethernet	Gigabit	Gigabit	Gigabit	Gigabit	Gigabit
Bluetooth	✓	✓	✓	✓	✓
USB	3x USB 3.0, 2x USB 2.0	3x USB 3.0	2x USB 3.0	2x USB 3.0	2x USB 3.0
FireWire	✗	✗	✗	✗	✗
Thunderbolt	✗	✗	✓	✗	✗
DisplayPort	✓	✓	✗	✓	✗
HDMI	✓	✓	✓	✗	✓
DVI	✗	✗	✗	✗	✗
VGA	✓	✗	✗	✗	✗
eSATA	✗	✗	✗	✗	✗
Media card slot	✓	✗	✓	✓	✓
Audio	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic
Optical drive	N/A	N/A	N/A	N/A	N/A
Extras	HD webcam	2Mp webcam	720p FaceTime	0.9Mp webcam	720p FaceTime
Operating system	Windows 8.1 64-bit	Windows 8.1	OS X Yosemite	Windows 7 Professional	OS X Yosemite
Bundled software	None	None	None	None	None
Gaming scores	189/157fps in Tomb Raider	89/64fps in Tomb Raider	Not tested	49/33fps in Tomb Raider	Not tested
Battery	74.7Wh lithium-polymer	52Wh lithium-polymer	74.9Wh lithium-ion	42Wh lithium-polymer	74.9Wh lithium-ion
Battery life	1 hr 48 mins	10 hrs 20 mins	8 hrs 58 mins	5 hrs 41 mins	17 hrs 5 mins
PCMark7 score	6304	5429	Not tested	4783	Not tested
Dimensions	425x303x24.5mm	328x235x26.7mm	358.9x247.1x18mm	338x232x17.3mm	314x219x18mm
Weight	3.2kg	2kg	2kg	1.6kg	1.6kg
Warranty	2-year return-to-base	1-year collect-and-return	1-year return-to-base	2-year return-to-base	1-year return-to-base
FULL REVIEW	TINYURL.COM/KLUXLGE	TINYURL.COM/O8VXAGL	TINYURL.COM/O6U4NCR	TINYURL.COM/OWV2FRR	TINYURL.COM/NG98LD4

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Best budget laptops	1 Asus X555LA-XX290H	2 Toshiba Chromebook 2	3 Dell Vostro 15	4 Toshiba Satellite CL10-B-100	5 Acer Chromebook 13
Price	£300 inc VAT	£269 inc VAT	£442 inc VAT	£200 inc VAT	£219 inc VAT
Website	Asus.com/uk	Toshiba.co.uk	Dell.co.uk	Toshiba.co.uk	Acer.co.uk
Build rating	★★★½☆	★★★★☆	★★★½☆	★★★★☆	★★★★☆
Features rating	★★★½☆	★★★★☆	★★★★☆	★★★½☆	★★★★☆
Performance rating	★★★½☆	★★★★½	★★★★☆	★★★★☆	★★★★☆
Value rating	★★★★☆	★★★★½	★★★★☆	★★½☆☆	★★★★☆
Overall rating	★★★★☆	★★★★½	★★★★☆	★★★★☆	★★★★☆
Processor	1.9GHz Intel Core i3-4030U	Intel Celeron	2.2GHz Intel Core i5-5200U	100	2.1GHz nVidia Tegra K1
RAM	4GB DDR3	4GB DDR3	4GB DDR3	2GB DDR3	4GB DDR3
Storage	1TB HDD	16GB SSD	500GB SSD	32GB eMMC	32GB SSD
Screen size	15.6in glossy	13.3in IPS	15.3in matt	11.6in glossy	13.3in
Screen resolution	1366x768	1920x1080	1366x768	1366x768	1920x1080
Graphics	Intel HD Graphics 4400	Intel HD Graphics	Intel HD Graphics 5000	Intel HD Graphics	nVidia Kepler
Video memory	N/A	N/A	N/A	N/A	N/A
Wireless	802.11b/g/n	802.11a/b/g/n/ac	802.11b/g/n/ac	802.11b/g/n	802.11a/b/g/n/ac
Ethernet	Gigabit	Gigabit	Gigabit	Gigabit	Gigabit
Bluetooth	✓	✓	✓	✓	✓
USB	1x USB 3.0, 2x USB 2.0	1x USB 3.0, 1x USB 2.0	1x USB 3.0, 2x USB 2.0	1x USB 3.0, 1x USB 2.0	2x USB 3.0
FireWire	✗	✗	✗	✗	✗
Thunderbolt	✗	✗	✗	✗	✗
DisplayPort	✗	✗	✗	✗	✗
HDMI	✓	✓	✓	✓	✓
DVI	✗	✗	✗	✗	✗
VGA	✓	✗	✗	✗	✗
eSATA	✗	✗	✗	✗	✗
Media card slot	✗	✓	✓	✗	✓
Audio	Headphone minijack	Headphone minijack	Headphone minijack	Headphone minijack	Headphone minijack
Optical drive	DVD writer	None	None	None	None
Extras	Kensington lock slot, webcam	Webcam	Kensington lock slot, webcam	Kensington lock slot, webcam	Webcam
Operating system	Windows 8.1	Google Chrome OS	Windows 8.1	Windows 8.1 with Bing	Google Chrome OS
Bundled software	None	None	None	None	None
Battery	37Wh Lithium-ion	Not specified	40Wh Lithium-polymer	26Wh Lithium-ion	Not specified
Battery life	5 hrs 17 mins	9 hrs	5 hrs 17 mins	6 hrs	9 hrs 20 mins
PCMark 8 Home score	1985	Not tested	2296	Not tested	Not tested
Batman (Low/High)	30fps/Not tested	Not tested	29fps/Not tested	Not tested	Not tested
Dimensions	381x257x26.3mm	320x214x19.3mm	1378x259x24.5mm	315x216x20.3mm	18x327x227.5mm
Weight	2.1kg	1.4kg	2.4kg	1.1kg	1.5kg
Warranty	1-year return-to-base	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/OMYZQJ3	TINYURL.COM/OP9NQAY	TINYURL.COM/NDAX6WT	TINYURL.COM/OQC4PUO	TINYURL.COM/Q2YT5AD

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Best ultraportable laptops	Apple MacBook Pro Retina 13in	HP EliteBook Folio 1040 G1	Apple MacBook Air 13in	Dell XPS 13 9343	Microsoft Surface Pro 3
	1	**2**	**3**	**4**	**5**
Price	£999 inc VAT	£2,116 inc VAT	£849 inc VAT	£1,099 inc VAT	£639 inc VAT
Website	Apple.com/uk	Hp.com/uk	Apple.com/uk	Dell.co.uk	Microsoft.com/en-gb
Build rating	★★★★½	★★★★½	★★★★☆	★★★★½	★★★★½
Features rating	★★★½☆	★★★★½	★★★★☆	★★★★☆	★★★★½
Performance rating	★★★★☆	★★★★½	★★★★☆	★★★★½	★★★★☆
Value rating	★★★★☆	★★★☆☆	★★★★☆	★★★★½	★★★½☆
Overall rating	★★★★½	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Processor	2.7GHz Intel Core i5	2.1GHz Intel Core i5-4600U	1.6GHz Intel Core i5	2.4GHz Intel Core i7-5500U	Intel Haswell Core i3
RAM	8GB LPDDR3	8GB DDR3L	4GB LPDDR3	8GB DDR3	4GB DDR3
Storage	128GB SSD	256GB SSD	128GB SSD	256GB SSD	64GB SSD
Screen size	13.3in matt	14in matt	13.3in glossy	13.3in IPS	12in ClearType
Screen resolution	2560x1600	1920x1080	1440x900	3200x2000	2160x1440
Graphics	Intel Iris Graphics 6100	Intel HD Graphics 4400	Intel HD Graphics 6000	Intel HD Graphics 5500	Intel HD Graphics 4400
Video memory	N/A	N/A	N/A	N/A	N/A
Wireless	802.11a/b/g/n/ac	802.11a/b/g/ac	802.11a/b/g/n/ac	802.11ac	802.11a/b/g/n/ac
Ethernet	Gigabit	Gigabit	None	Gigabit	None
Bluetooth	✓	✓	✓	✓	✓
USB	2x USB 3.0	2x USB 3.0	2x USB 3.0	2x USB 3.0	1x USB 3.0
FireWire	✗	✗	✓	✗	✗
Thunderbolt	✗	✗	✓	✗	✗
DisplayPort	✗	✓	✗	✗	✓
HDMI	✓	✗	✗	✗	✗
DVI	✗	✗	✗	✗	✗
VGA	✗	✗	✗	✗	✗
eSATA	✗	✗	✗	✗	✗
Media card slot	✓	✓	✓	✓	✗
Audio	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack	Headphone jack, mic
Optical drive	N/A	N/A	N/A	N/A	N/A
Extras	720p FaceTime	0.9Mp webcam	720p FaceTime	720p webcam	5Mp webcam
Operating system	OS X Yosemite	Windows 7 Professional	OS X Yosemite	Windows 8.1 64-bit	Windows 8.1 Pro
Bundled software	None	None	None	Microsoft Office 2013 Trial	None
Gaming scores	Not tested	49/33fps in Tomb Raider	Not tested	40fps Batman: Arkham City	Not tested
Battery	74.9Wh lithium-ion	42Wh lithium-polymer	38Wh lithium-ion	52Wh lithium-polymer	8000mAh lithium-ion
Battery life	17 hrs 5 mins	5 hrs 41 mins	12 hrs 49 mins	6 hrs 12 mins	9 hrs
PCMark 7 score	Not tested	4783	Not tested	Not tested	Not tested
Dimensions	314x219x18mm	338x232x17.3mm	300x192x17mm	304x200x15mm	292x201.3x9.1mm
Weight	1.6kg	1.6kg	1.4kg	1.3kg	0.8kg
Warranty	1-year return-to-base	2-year return-to-base	1-year return-to-base	1-year next business day	1-year return-to-base
FULL REVIEW	TINYURL.COM/NG98LD4	TINYURL.COM/OWV2FRR	TINYURL.COM/PH3YN5K	TINYURL.COM/PPD3BYW	TINYURL.COM/OLDJ9KK

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Best Chromebooks	1 Toshiba Chromebook 2	2 Acer Chromebook 13	3 Dell Chromebook 11	4 HP Chromebook 14	5 Acer C720p Chromebook
Price	£269 inc VAT	£219 inc VAT	£239 inc VAT	£259 inc VAT	£249 inc VAT
Website	Toshiba.co.uk	Acer.co.uk	Dell.co.uk	Hp.com/uk	Uk.asus.com
Build rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Features rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Performance rating	★★★★½	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Value rating	★★★★½	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Overall rating	★★★★½	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Processor	Intel Celeron	2.1GHz nVidia Tegra K1	1.4GHz Intel Celeron 2955U	1.4GHz Intel Celeron 2955U	1.4GHz Intel Celeron 2955U
RAM	4GB DDR3	4GB DDR3	4GB DDR3	4GB DDR3	2GB DDR3
Storage	16GB SSD	32GB SSD	16GB SSD	16GB SSD	16GB SSD
Screen size	13.3in IPS	13.3in	11.6in glossy	14in glossy	11.6in glossy
Screen resolution	1920x1080	1920x1080	1366x768	1366x768	1366x768
Graphics	Intel HD graphics	nVidia Kepler	Intel HD Graphics	Intel HD graphics	Intel HD graphics
Video memory	N/A	N/A	N/A	N/A	N/A
Wireless	802.11a/b/g/n/ac	802.11a/b/g/n/ac	802.11a/b/g/n	802.11a/b/g/n	802.11a/b/g/n
Ethernet	Gigabit	Gigabit	Gigabit	Gigabit	Gigabit
Bluetooth	✓	✓	✓	✓	✓
USB	1x USB 3.0, 1x USB 2.0	2x USB 3.0	2x USB 3.0	2x USB 3.0, 1x USB 2.0	1x USB 3.0, 1x USB 2.0
FireWire	✗	✗	✗	✗	✗
Thunderbolt	✗	✗	✗	✗	✗
DisplayPort	✗	✗	✗	✗	✗
HDMI	✓	✓	✓	✓	✓
DVI	✗	✗	✗	✗	✗
VGA	✗	✗	✗	✗	✗
eSATA	✗	✗	✗	✗	✗
Media card slot	✓	✓	✓	✓	✓
Audio	Headphone minijack	Headphone minijack	Headphone minijack	Headphone minijack	Headphone minijack
Optical drive	N/A	N/A	N/A	N/A	N/A
Extras	Webcam	Webcam	Webcam	Webcam	Webcam
Operating system	Google Chrome OS	Google Chrome OS	Google Chrome OS	Google Chrome OS	Google Chrome OS
Bundled software	None	None	None	None	None
Battery life	9 hrs	9 hrs 20 mins	7 hrs 17 mins	7 hrs 50 mins	6 hrs 7 mins
SunSpider score	Not tested	660ms	465ms	470ms	502ms
Peacekeeper score	Not tested	Not tested	2468	2478	2453
Browsermark score	Not tested	Not tested	3732	3643	3698
Dimensions	320x214x19.3mm	18x327x227.5mm	295x201x24mm	20.5x345x239mm	19.1x288x204mm
Weight	1.4kg	1.5kg	1.3kg	1.7kg	1.4kg
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/OP9NQAY	TINYURL.COM/Q2YT5AD	TINYURL.COM/M3D3QJ4	TINYURL.COM/OCU7FTY	TINYURL.COM/O9KFZMA

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Best gaming laptops	**1** Asus G751T-T717H	**2** Schenker XMG U506	**3** Alienware 13	**4** MSI GS60 2QD-470UK	**5** Toshiba Satellite P50T-C-109
Price	£1,559 inc VAT	£1,585 inc VAT	£1,100 inc VAT	£1,299 inc VAT	£799 inc VAT
Website	Asus.com/uk	Mysn.co.uk	Alienware.co.uk	UK.msi.com	Toshiba.co.uk
Build rating	★★★★½	★★★★☆	★★★★½	★★★★☆	★★★★☆
Features rating	★★★★½	★★★★½	★★★★☆	★★★★☆	★★★½☆
Performance rating	★★★★½	★★★★½	★★★★☆	★★★★☆	★★★★☆
Value rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Overall rating	★★★★½	★★★★☆	★★★★½	★★★★☆	★★★½☆
Processor	2.3GHz Intel Core i7-4850HQ	3.5GHz Intel Core i5-6600K	2.4GHz Intel Core i7-5500U	2.6GHz Intel Core i7-4720HQ	2.2GHz Intel Core i5-5200U
RAM	24GB (3x 8BG) DDR3	8GB (2x 4GB) DDR3	8GB (2x 4GB) DDR3	16GB (2x 8BG) DDR3	12GB (1x 8GB, 1x 4GB) DDR3
Storage	1TB HDD, 256GB SSD	256GB SSD, 1TB HDD	256GB SSD	1TB HDD, 128GB SSD	1TB SHDD
Screen size	17.3in matt	15.6in matt	13.3in matt	15.6in matt	15.6in matt
Screen resolution	1920x1080	1920x1080	1920x1080	1920x1080	3840x2160
Graphics	nVidia GeForce GTX 970M	nVidia GeForce GTX 970M	nVidia GeForce GTX 860M	nVidia GeForce GTX 965M	nVidia GeForce GTX 950M
Video memory	Not specified	Not specified	2GB	3GB	Not specified
Wireless	802.11ac	802.11ac	802.11ac	802.11ac	802.11ac
Ethernet	Gigabit	Gigabit	Gigabit	Gigabit	Gigabit
Bluetooth	✓	✓	✓	✓	✓
USB	4x USB 3.0	3x USB 3.0, 1x eSATA/USB 3.0	3x USB 3.0	3x USB 3.0	3x USB 3.0
FireWire	✗	✗	✗	✗	✗
Thunderbolt	✓	✗	✗	✗	✗
DisplayPort	✗	✓	✓	✗	✓
HDMI	✓	✓	✓	✗	✗
DVI	✗	✗	✗	✗	✗
VGA	✓	✗	✗	✗	✗
eSATA	✗	✗	✗	✗	✗
Media card slot	✗	✓	✗	✓	✓
Audio	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic
Optical drive	None	None	None	N/A	BD-RE/DVD±RW
Extras	Integrated webcam	2Mp webcam	2Mp webcam	2.1Mp webcam	0.9Mp webcam
Operating system	Windows 8.1	Windows 8.1 Pro	Windows 8.1	Windows 8.1	Windows 8.1
Bundled software	None	None	None	None	None
Gaming scores	115/95fps in Tomb Raider	113/58fps in Tomb Raider	89/64fps in Tomb Raider	123/82fps in Tomb Raider	35/323fps in Tomb Raider
Battery	90Wh lithium-ion	82Wh lithium-polymer	52Wh lithium-polymer	48Wh lithium-ion	44Wh lithium-polymer
Battery life	3 hrs 9 mins	2 hrs 23 mins	10 hrs 20 mins	2 hrs 49 mins	3 hrs 20 mins
PCMark 7 score	Not tested	4000 (PCMark 8)	5429	6241	1797 (PCMark 8)
Dimensions	389x265x20.3mm	387x266x37.5mm	328x235x26.7mm	389x265x20.3mm	380x257x23.7mm
Weight	416x318x39-82mm	3.4kg	2kg	2kg	2.3kg
Warranty	1 year	1 year	1-year collect-and-return	2-year return-to-base	1 year
FULL REVIEW	TINYURL.COM/NGNVC6Q	TINYURL.COM/NT6UUKF	TINYURL.COM/O8VXAGL	TINYURL.COM/O6Q3JJD	TINYURL.COM/QZ8E7GW

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Best gaming PCs	1 PC ADVISOR RECOMMENDED	2 PC ADVISOR RECOMMENDED	3	4 PC ADVISOR RECOMMENDED	
	Wired2Fire Diablo Skylake	Chillblast Fusion Krypton	Vibox Spawn X	Mesh Elite Skylake PCA	Eclipse SuperNova i566n9700C
Price	£899 inc VAT	£869 inc VAT	£979 inc VAT	£999 inc VAT	£899 inc VAT
Website	Wired2fire.co.uk	Chillblast.com	Vibox.co.uk	Meshcomputers.co.uk	Eclipsecomputers.com
Build rating	★★★★½	★★★★★	★★★★½	★★★★★	★★★★☆
Features rating	★★★★☆	★★★½☆	★★★★★	★★★★½	★★★★½
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★☆
Value rating	★★★★★	★★★★★	★★★★☆	★★★★☆	★★★★½
Overall rating	★★★★★	★★★★½	★★★★½	★★★★½	★★★★☆
Processor	3.5GHz Intel Core i5-6600K (OC 4.4GHz)	3.5GHz Intel i5-6600K (OC 4.2GHz)	3.5GHz Intel i5-6600K (OC 4.5GHz)	3.5GHz Intel i5-6600K (OC 4.4GHz)	3.5GHz Intel Core i5-6600K (4.2GHz OC)
CPU cooler	Prolimatech Basic 68	Akasa Nero	Coolermaster Seidon 120v	Raijintek Triton 240mm AIO Water Cooling Solution	Zalman CNPS11X Performa
Memory	16GB DDR4	16GB DDR4	8GB Patriot Viper Xtreme	16GB DDR4	16GB DDR4
Storage	1TB HDD + 250GB SSD	2TB HDD + 128GB SSD	2TB HDD + 240GB SSD	1TB SSHD + 250GB SSD	1TB HDD + 240GB SSD
Power supply	500W FSP	600W Aerocool Integrator	650W Superflower HX65	750W FSP Quiet Power Supply	500W Corsair VS Series
Motherboard	Asus Z170-P	Asus Z170M-Plus	MSI Z170A Gaming Pro	Gigabyte GA-Z170X-Gaming 3	Asus Z170-P
Operating system	Windows 10 Home	Windows 10 Home	Windows 10 Home	Windows 10 Home	Windows 10 Home
Screen	Asus VS247HR	28in AOC U2868Pqu	None supplied	None supplied	26in HKC 2615
Graphics	MSI nVidia GeForce GTX 970	MSI nVidia GeForce GTX 970	MSI nVidia GeForce GTX 970	Palit nVidia GeForce GTX 970	Palit nVidia GeForce GTX 970
Sound	Onboard	Onboard	Onboard	Onboard	Onboard
Connectivity	Gigabit ethernet	Gigabit ethernet	Gigabit ethernet	Gigabit ethernet	Gigabit ethernet
Ports	1x USB 3.1 Type-C, 4x USB 3.0, 4x USB 2.0	1x USB 3.1 Type-C, 3x USB 3.0, 4x USB 2.0, 2x DVI, HDMI, 2x DP	2x USB 3.1 Gen2, 6x USB 3.1 Gen1, 6x USB 2.0	3x USB 3.0 ,2x USB 2.0, USB 3.1 Type-A, USB 3.1 Type-C, HDMI, DVI-D, D-Sub	1x USB 3.1 Type-C, 3x USB 3.0, 3x USB 2.0, DVU, HDMI, 2x DP
Optical drive	DVD±RW	None	DVD±RW	DVD±RW	DVD±RW
Case	Zalman Z11 Neo	Chillblast Kube	Phanteks Enthoo Pro Mid	Aero Cool DS 200	Corsair Carbide Spec-03
Keyboard & mouse	Cooler Master Devastator Keyboard and Mouse	Thermaltake E-Sports Commander Gaming Set	Cooler Master Devastator Keyboard and Mouse	Roccat Isku Keyboard, Roccat Lua Mouse	Thermaltake E-Sports Commander Gaming Set
Other	None	None	None	None	None
PCMark 8 2.0 Home score	5434	5332	5327	5316	4575
Alien vs Predator score (720p/1080p)	172.6/90.1fps	173.4/90.7fps	169.7/89.8fps	169.6/89.6fps	170.3/88.8fps
Final Fantasy XIV (Maximum)	133.2fps	134.6fps	132.8fps	130.4fps	128.3fps
Sniper Elite V2 (Low/Medium/Ultra)	461.4/208.5/49fps	459.6/201.8/49.2fps	447.3/205.9/49fps	444.7/203.2/47.6fps	356.4/203.9/47.7fps
Power Consumption	5/295W	55/303W	Not tested	63/251W	51/264W
Warranty	2 years parts, 3 years labour	5 years: first 2 years C&R + labour, remaining 3 labour	Vibox Evolution Lifetime Warranty	Lifetime labour, 2 years parts, 1-year C&R	3-year RTB (1-year parts only), 30-day C&R
FULL REVIEW	TINYURL.COM/NBC7YNC	TINYURL.COM/OK4Z5QO	TINYURL.COM/KKKRXAD	TINYURL.COM/PULQUJ2	TINYURL.COM/P9CVRNQ

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Verdict

The Galaxy Gear is a mixed bag. We love the stylish design and nice screen. It's packed with handy features, but performance and potentially poor battery life are concerns. You can use it with only a handful of Galaxy smartphones, and it's pricey.

version for free will tempt more users to upgrade to the Premium service.

Spotify said users will be able to listen to their playlists and also hit 'shuffle play' to listen to a particular artist's entire back catalogue. The firm has started making available Led Zeppelin's back catalogue, releasing two albums per week.

The firm is also dropping the 10-hours-per-month limit that it had previously imposed on users of its free service.

While Spotify is available on iOS and Android smartphones and tablets, there are no apps for Windows Phone 8 and BlackBerry.

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All-in-one PCs	1 Apple iMac with 5K display	2 Acer Aspire AZ3-615	3 Chillblast Volante AIO	4 Asus Eee Top	5 HP Envy Beats 23-n001na
Price	£1,999 inc VAT	£799 inc VAT	£1,299 inc VAT	£799 inc VAT	£900 inc VAT
Website	Apple.com/uk	Acer.co.uk	Chillblast.com	Asus.com/uk	Hp.com/uk
Build rating	★★★★★	★★★½☆	★★★☆☆	★★★½☆	★★★★☆
Features rating	★★★★★	★★½☆☆	★★★★☆	★★★★☆	★★★☆☆
Performance rating	★★★★☆	★★★½☆	★★★★★	★★½☆☆	★★½☆☆
Value rating	★★★★½	★★★★☆	★★★★☆	★★★☆☆	★★★½☆
Overall rating	★★★★★	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Processor	3.9GHz Intel Core i5-4690	2.7GHz Intel Core i5-4460T	4GHz Intel Core i7-4790S	2.6GHz Intel Core i5-4200U	3.2GHz Intel Core i7-4785T
RAM	8GB DDR3	8GB DDR3	16GB DDR3	6GB DDR3	8GB DDR3
Storage	1TB Fusion Drive	1TB HDD	1TB SSD	1TB HDD	1TB HDD
Screen	27in	23in touchscreen	24in	23in touchscreen	23in touchscreen
Screen resolution	5120x2880	1920x1080	1920x1080	1920x1080	1920x1080
Graphics card	AMD Radeon M9 M290X	nVidia GeForce GT 840M	nVidia GeForce GT 750M	Intel HD Graphics 4400	Intel HD Graphics 4600
Video memory	2GB	2GB	2GB	N/A	N/A
Wireless	802.11b/g/n	802.11b/g/n	802.11b/g/n	802.11b/g/n	802.11b/g/n
Ethernet	Gigabit	Gigabit	Gigabit	Gigabit	Gigabit
Bluetooth	✗	✗	✗	✗	✗
USB	4x USB 3.0	2x USB 3.0, 3x USB 2.0	4x USB 3.0, 2x USB 2.0	3x USB 3.0, 3x USB 2.0	2x USB 3.0, 4x USB 2.0
FireWire	✗	✗	✗	✗	✗
Thunderbolt	✓	✗	✗	✗	✗
HDMI	✗	✗	✓	✓	✓
Media card slot	✓	✓	✓	✓	✓
Optical drive	None	DVD Writer	Blu-Ray Combo	DVD Writer	DVD Writer
Other	Final Cut Pro X, Logic Pro X, Aperture	1Mp webcam, wireless keyboard and mouse	Logitech MK520 wireless keyboard and mouse	2Mp webcam, Freeview TV, wireless keyboard and mouse	Wireless keyboard and mouse, Beats Audio stereo speaker system (8x 12W)
Operating system	OS X Yosemite	Windows 8.1 64-bit	Windows 8.1 64-bit	Windows 8.1 64-bit	Windows 8.1 64-bit
Power consumption (idle/max)	46/215W	46/91W	35/177W	33/69W	43/81W
Sniper V2 Elite (Low/High/Ultra)	Not tested	47.7/18.7/5.1fps	91.5/41.2/10.5fps	31.4/7.8/5fps	27.7/7.4/5fps
PCMark 8 Home score	Not tested	2906	3776	2828	2702
Dimensions	650x203x516mm	540x489x579mm	585x200x450mm	571x359x50-214mm	563x143x413mm
Weight	9.54kg	8.8kg	14.6kg	9kg	8.4kg
Warranty	1-year return-to-base	Not specified	5-year labour (2-year collect-and-return)	1-year return-to-base	1-year limited parts, labour, and pickup-and-return service
FULL REVIEW	TINYURL.COM/NWJUJSF	TINYURL.COM/QEY8FOE	TINYURL.COM/LO8A5MC	TINYURL.COM/PRPHC7L	TINYURL.COM/O6M4BCN

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Best smartphones	1 PC ADVISOR RECOMMENDED	2	3	4	5 PC ADVISOR RECOMMENDED
	Samsung Galaxy S6	Google Nexus 6P	Apple iPhone 6s Plus	Samsung Galaxy Note5	LG G4
Price	£349 inc VAT	£449 inc VAT	£619 inc VAT	£600 inc VAT	£500 inc VAT
Website	Samsung.com/uk	Google.co.uk	Apple.com/uk	Samsung.com/uk	Lg.com/uk
Build rating	★★★★½	★★★★½	★★★★½	★★★★½	★★★★☆
Features rating	★★★★½	★★★★½	★★★★½	★★★★☆	★★★★☆
Performance rating	★★★★½	★★★★☆	★★★★½	★★★★½	★★★★☆
Value rating	★★★★☆	★★★★½	★★★★☆	★★★★☆	★★★★½
Overall rating	★★★★½	★★★★½	★★★★½	★★★★½	★★★★☆
OS (out of box)	Android 5.0 Lollipop	Android 6.0 Marshmallow	iOS 9	Android 5.1.1 Lollipop	Android 5.1 Lollipop
Processor	2.1GHz Exynos 7420	Qualcomm Snapdragon 810	A9	2.1GHz Exynos 7420	Snapdragon 808 six-core
RAM	3GB	3GB	2GB	4GB	3GB
Storage	32/64GB	32/64/128GB	16/64/128GB	32/64GB	32GB
MicroSD support	✗	✗	✗	✗	Up to 128GB
Graphics	Mali-T760 GPU	Adreno 430	M9	Mali-T760MP8	Adreno 418
Screen size	5.1in	5.7in	5.5in	5.7in	4.5in
Screen resolution	1440x2560	2560x1440	1920x1080	720x1280	1440x2560
Pixel density	577ppi	518ppi	401ppi	518ppi	538ppi
Screen technology	Super AMOLED	Quad HD capacitive	IPS	Super AMOLED	IPS
Front camera	5Mp	8Mp	5Mp	5Mp	8Mp
Rear camera	16Mp, LED flash	12.3Mp, LED flash	12Mp, LED flash	16Mp, LED flash	16Mp
Video recording	4K	4K	4K	4K	4K
Cellular connectivity	4G	4G	4G	4G	4G
SIM type	Nano-SIM	Nano-SIM	Nano-SIM	Nano-SIM	Micro-SIM
Dual-SIM as standard	✗	✗	✗	✗	✗
Wi-Fi	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band
Bluetooth	Bluetooth 4.1	Bluetooth 4.2	Bluetooth 4.2	Bluetooth 4.2	Bluetooth 4.1
GPS	GPS, Glonass	A-GPS, Glonass	A-GPS, Glonass	A-GPS, Glonass	A-GPS, Glonass
NFC	✓	✓	✓	✓	✓
USB OTG	✓	✓	✓	✓	✓
Extra features	Heart-rate sensor, fingerprint scanner	Fingerprint scanner	Fingerprint scanner	Heart-rate sensor, fingerprint scanner	24-bit/192kHz audio, rear key
Geekbench 3.0 (single)	1347	Not tested	2527	1497	Not tested
Geekbench 3.0 (multi)	4438	3939	4407	Not tested	3513
SunSpider	1048ms	636ms	210ms	718ms	715ms
GFXBench: T-Rex	30fps	34fps	59fps	37fps	25fps
GFXBench: Manhattan	14fps	14fps	38fps	15fps	9fps
Battery	2550mAh, non-removable	3450mAh, non-removable	Lithium-on	23000mAh, non-removable	3000mAh removable
Dimensions	143.4x70.5x6.8mm	159.3x77.8x7.3mm	158.2x77.9x7.3mm	153.2x76.1x7.6mm	64.9x127x8.6mm
Weight	138g	178g	192g	171g	155g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/PC2KOYQ	TINYURL.COM/NABSV4E	TINYURL.COM/OYRA5MX	TINYURL.COM/OCQAJPL	TINYURL.COM/ORQ82MS

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Best budget smartphones	**1** Vodafone Smart Ultra 6	**2** Motorola Moto E 4G 2015	**3** Vodafone Smart Prime 6	**4** Wileyfox Swift	**5** EE Harrier Mini
Price	£125 inc VAT	£109 inc VAT	£79 inc VAT	£129 inc VAT	£99 inc VAT
Website	Vodafone.co.uk	Motorola.co.uk	Vodafone.co.uk	Wileyfox.com	EE.co.uk
Build rating	★★★★½	★★★★☆	★★★★½	★★★★☆	★★★★☆
Features rating	★★★★½	★★★★☆	★★★★☆	★★★★☆	★★★½☆
Performance rating	★★★★½	★★★★☆	★★★★★	★★★½☆	★★★½☆
Value rating	★★★★★	★★★★★	★★★★☆	★★★★½	★★★★½
Overall rating	★★★★½	★★★★☆	★★★★½	★★★★☆	★★★★☆
OS (out of box)	Android 5.0.2 Lollipop	Android 5.0 Lollipop	Android 5.0.2 Lollipop	Cyanogen OS	Android 5.0 Lollipop
Processor	2.5GHz Snapdragon 615	1.2GHz Snapdragon 410	1.2GHz Snapdragon 410	1.2GHz Snapdragon 410	1.2GHz
RAM	2GB	1GB	1GB	2GB	1GB
Storage	16GB	8GB	8GB	16GB	8GB
MicroSD support	Up to 128GB	Up to 32GB	Up to 64GB	Up to 32GB	Not specified
Graphics	Adreno 405	Adreno 306	Adreno 306	Adreno 306	Not specified
Screen size	5.5in	4.5in	5in	5in	4.7in
Screen resolution	1920x1080	540x960	720x1280	1280x720	720x1280
Pixel density	401ppi	245ppi	294ppi	294ppi	312ppi
Screen technology	IPS	IPS	IPS	IPS	IPS
Front camera	5Mp	0.3Mp	2Mp	5Mp	2Mp
Rear camera	13Mp	5Mp	8Mp	13Mp, LED flash	8Mp, LED flash
Video recording	1080p	720p	1080p	1080p	720p
Cellular connectivity	4G*	4G	4G*	4G	4G
SIM type	Nano-SIM	Micro-SIM	Micro-SIM	Micro-SIM	Micro-SIM
Dual-SIM as standard	✗	✗	✗	✗	✗
Wi-Fi	802.11b/g/n	802.11b/g/n	802.11b/g/n	802.11b/g/n	802.11b/g/n
Bluetooth	Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.0
GPS	GPS, A-GPS	GPS, A-GPS, Glonass	A-GPS	A-GPS	A-GPS, Glonass
NFC	✓	✗	✗	✗	✗
USB OTG	✗	✗	✓	✓	✓
Extra features	FM radio	Double-twist launches camera, lockscreen alerts	FM radio	3D G-Sensor,	Wi-Fi calling
Geekbench 3.0 (single)	649	464	464	Not tested	Not tested
Geekbench 3.0 (multi)	2469	1463	1401	1456	1549
SunSpider	1545ms	1301ms	1301ms	1760ms	1880ms
GFXBench: T-Rex	14fps	13fps	9.4fps	10fps	10fps
GFXBench: Manhattan	5.7fps	6fps	3.8fps	4fps	4fps
Battery	3000mAh, non-removable	2390mAh, non-removable	Not specified	2500mAh, removable	2000mAh, non-removable
Dimensions	154x77x9mm	66.8x5.2-12.3x129.9mm	141.65x71.89x9mm	141x71x9.4mm	138x67.9x9.5mm
Weight	159g	145g	155g	135g	124g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/Q7Q9NXR	TINYURL.COM/Q7Q9NXR	TINYURL.COM/Q5DSNHE	TINYURL.COM/PO9KG38	TINYURL.COM/PXTROH4

* Locked to Vodafone. All other models here are unlocked

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Best phablets	Samsung Galaxy Note5	Samsung Galaxy Note 4	LG G4	LG G3	OnePlus 2
	1	2 PC ADVISOR RECOMMENDED	3	4 PC ADVISOR GOLD	5
Price	£600 inc VAT	£599 inc VAT	£500 inc VAT	£479 inc VAT	£239 inc VAT
Website	Samsung Galaxy Note 5	Samsung.com/uk	Lg.com/uk	Lg.com/uk	Oneplus.net
Build rating	★★★★½	★★★★☆	★★★★☆	★★★★½	★★★★☆
Features rating	★★★★☆	★★★★½	★★★★☆	★★★★½	★★★★☆
Performance rating	★★★★½	★★★★☆	★★★★☆	★★★★½	★★★★☆
Value rating	★★★★☆	★★★★☆	★★★★½	★★★★½	★★★★★
Overall rating	★★★★½	★★★★☆	★★★★☆	★★★★½	★★★★☆
OS (out of box)	Android 5.1.1 Lollipop	Android 4.4 KitKat	Android 5.1 Lollipop	Android 4.4 KitKat	OxygenOS 2.0 (Android 5.1)
Processor	2.1GHz Exynos 7420	2.7GHz Snapdragon 805	1.82GHz Snapdragon 808	2.5GHz Snapdragon 801	1.8GHz Snapdragon 801
RAM	4GB	3GB	3GB	2GB/3GB	3/4GB
Storage	32/64GB	32GB	32GB	16GB/32GB	16GB/64GB
MicroSD support	✗	Up to 128GB	Up to 128GB	✗	✗
Graphics	Mali-T760MP8	Adreno 420	Adreno 418	Adreno 330	Adreno 430
Screen size	5.7in	5.7in	5.5in	5.5in	5.5in
Screen resolution	720x1280	1440x2560	1440x2560	1440x2560	1920x1080
Pixel density	518ppi	515ppi	538ppi	534ppi	401ppi
Screen technology	Super AMOLED	Super AMOLED	IPS	IPS	IPS
Front camera	5Mp	3.7Mp	8Mp	2Mp	5Mp
Rear camera	16Mp, LED flash	16Mp, LED flash	16Mp, LED flash	13Mp, LED flash	13Mp, Dual-LED flash
Video recording	4K	4K	4K	4K	4K
Cellular connectivity	4G	4G	4G	4G	4G
SIM type	Nano-SIM	Micro-SIM	Micro-SIM	Micro-SIM	Dual-SIM
Dual-SIM as standard	✗	✗	✗	✗	Yes
Wi-Fi	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band	802.11ac, dual-band
Bluetooth	Bluetooth 4.2	Bluetooth 4.1	Bluetooth 4.0	Bluetooth 4.0 (aptX)	Bluetooth 4.0
GPS	A-GPS, Glonass	GPS, Glonass	A-GPS, Glonass	A-GPS, Glonass	GPS, Glonass
NFC	✓	✓	✓	✓	✗
USB OTG	✓	✓	✓	✓	✓
Extra features	Heart-rate sensor, fingerprint scanner	Fingerprint, UV, heart-rate sensors, S Pen stylus	24bit/192kHz audio, rear key, IR blaster	24bit/192kHz audio, rear key	None
Geekbench 3.0 (single)	1497	Not tested	Not tested	Not tested	Not tested
Geekbench 3.0 (multi)	Not tested	3272	3513	2465	4094
SunSpider	718ms	1367ms	715ms	959ms	1471ms
GFXBench: T-Rex	37fps	27fps	25fps	20fps	46fps
GFXBench: Manhattan	15fps	11fps	9fps	Not tested	16fps
Battery	23000mAh, non-removable	3220mAh, removable	3000mAh, removable, Qi	3000mAh, removable, Qi	3300mAh, non-removable
Dimensions	153.2x76.1x7.6mm	78.6x153.5x8.5mm	76x149x6.3-9.8mm	75x146x8.9mm	151.8x74.9x9.9mm
Weight	171g	176g	155g	149g	175g
Warranty	1 year	2 years	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/OCQAJPL	TINYURL.COM/PNHJCZ4	TINYURL.COM/QDGU48T	TINYURL.COM/OA76T73	TINYURL.COM/NSGEV3U

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Best 7- & 8in tablets

	1 Google Nexus 7	**2** Samsung Galaxy Tab S 8.4	**3** Sony Xperia Z3 Tablet Compact	**4** Apple iPad mini 2	**5** Google Nexus 9
	PC ADVISOR GOLD	PC ADVISOR GOLD	PC ADVISOR RECOMMENDED	PC ADVISOR RECOMMENDED	
Price	£199 inc VAT	£319 inc VAT	£299 inc VAT	£219 inc VAT	£299 inc VAT
Website	Play.google.com	Samsung.com/uk	Sony.co.uk	Apple.com/uk	Google.co.uk
Build rating	★★★★☆	★★★★☆	★★★★☆	★★★★½	★★★½☆
Features rating	★★★★½	★★★★½	★★★★½	★★★★☆	★★★★☆
Performance rating	★★★★½	★★★★½	★★★★½	★★★★½	★★★★½
Value rating	★★★★½	★★★★½	★★★★☆	★★★★☆	★★★★☆
Overall rating	★★★★½	★★★★½	★★★★½	★★★★½	★★★★☆
OS (out of box)	Android 4.3 Jelly Bean	Android 4.4 KitKat	Android 4.4 KitKat	iOS 9	Android 5.0 Lollipop
Processor	1.5GHz Snapdragon S4 Pro	Exynos 5420, octa-core	2.5GHz Snapdragon 801	Apple A7, Apple M7	2.3GHz nVidia Tegra K1
RAM	2GB	3GB	3GB	1GB	2GB
Storage	16GB/32GB	16GB/32GB	16GB/32GB	16GB/32GB	16GB/32GB
MicroSD support	✗	Up to 128GB	Up to 128GB	✗	No
Graphics	Adreno 320	ARM Mali-T628 MP6	Adreno 330	Apple A7	192-core Kepler
Screen size	7in	8.4in	8in	7.9in	8.9in
Screen resolution	1920x1200	2560x1440	1920x1200	2048x1536	2048x1536
Pixel density	323ppi	359ppi	283ppi	326ppi	287ppi
Screen technology	IPS	Super AMOLED	IPS	IPS	IPS
Front camera	1.2Mp	2.1Mp	2.2Mp	1.2Mp	1.6Mp
Rear camera	5Mp	8Mp, LED flash	8.1Mp	5Mp	8Mp, LED flash
Video recording	1080p	1080p	1080p	7200p	1080p
Cellular connectivity	4G version available	4G version available	4G version available	4G version available	4G version available
Wi-Fi	802.11b/g/n, dual-band	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n, dual-band	802.11a/b/g/n/ac, dual-band
Bluetooth	Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.1
GPS	GPS, Glonass	GPS, Glonass	A-GPS, Glonass	A-GPS, Glonass	GPS, Glonass
NFC	✓	✗	✓	✗	Yes
USB OTG	✓	✓	✓	✗	Yes
Fingerprint scanner	✗	✓	✗	✗	No
Waterproof	✗	✗	✓	✗	No
Extra features	None	Stereo speakers	PS4 Remote Play, stereo speakers	None	BoomSound speakers
Geekbench 3.0 (single)	Not tested	Not tested	Not tested	Not tested	1904
Geekbench 3.0 (multi)	Not tested	2765	2708	Not tested	3352
SunSpider	1136ms	1089ms	1017ms	397ms	955ms
GFXBench: T-Rex	Not tested	14fps	28fps	Not tested	48fps
GFXBench: Manhattan	Not tested	3fps	11fps	Not tested	22fps
Battery	3950mAh, non-removable, Qi	4900mAh, non-removable	4500mAh, non-removable	6470mAh, non-removable	6700mAh, non-removable
Dimensions	200x114x8.65mm	126x213x6.6mm	213x124x6.4mm	200x134.7x7.5mm	153.7x228.3x8mm
Weight	299g	294g	270g	331g	425g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/PUJDJBY	TINYURL.COM/OUEM64Z	TINYURL.COM/NJ6VHEO	TINYURL.COM/PCJPB5L	TINYURL.COM/NQ6K77Y

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Best 9- & 10in tablets	**1** PC ADVISOR GOLD Apple iPad Air 2	**2** PC ADVISOR RECOMMENDED Samsung Galaxy Tab S 10.5	**3** PC ADVISOR RECOMMENDED Sony Xperia Z2 Tablet	**4** PC ADVISOR RECOMMENDED Apple iPad Air	**5** PC ADVISOR RECOMMENDED Google Nexus 10
Price	£399 inc VAT	£399 inc VAT	£369 inc VAT	£319 inc VAT	£389 inc VAT
Website	Apple.com/uk	Samsung.com/uk	Sony.co.uk	Apple.com/uk	Play.google.com
Build rating	★★★★★	★★★★☆	★★★★⯪	★★★★☆	★★★★⯪
Features rating	★★★★⯪	★★★★⯪	★★★★⯪	★★★★⯪	★★★★⯪
Performance rating	★★★★⯪	★★★★⯪	★★★★⯪	★★★★⯪	★★★★⯪
Value rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★⯪
Overall rating	★★★★⯪	★★★★⯪	★★★★⯪	★★★★☆	★★★★⯪
OS (out of box)	iOS 8.2	Android 4.4 KitKat	Android 4.4 KitKat	iOS 8.2	Android 4.2 Jelly Bean
Processor	Apple A8X, Apple M8	Exynos 5420, octa-core	2.3GHz Snapdragon 801	Apple A7, Apple M7	1.7GHz Exynos 5250
RAM	2GB	3GB	3GB	1GB	2GB
Storage	16GB/64GB/128GB	16GB/32GB	16GB	16GB/32GB	16GB/32GB
MicroSD support	No	Up to 128GB	Up to 64GB	No	No
Graphics	Apple A8X	ARM Mali-T628 MP6	Adreno 330	Apple A7	ARM Mali T604
Screen size	9.7in	10.5in	10.1in	9.7in	10.1in
Screen resolution	2048x1536	2560x1600	1920x1200	2048x1536	2560x1600
Pixel density	264ppi	288ppi	224ppi	264ppi	300ppi
Screen technology	IPS	Super AMOLED	IPS	IPS	IPS
Front camera	1.2Mp	2.1Mp	2.2Mp	1.2Mp	1.9Mp
Rear camera	8Mp	8Mp, LED flash	8.1Mp	5Mp	5Mp, LED flash
Video recording	1080p	1080p	1080p	1080p	1080p
Cellular connectivity	4G version available	4G version available	4G version available	4G version available	No
Wi-Fi	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n, dual-band	802.11b/g/n, dual-band
Bluetooth	Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.0
GPS	A-GPS, Glonass	GPS, Glonass	GPS, Glonass	A-GPS, Glonass	GPS, Glonass
NFC	Yes (for Apple Pay)	No	Yes	No	Yes
USB OTG	✗	Yes	Yes	No	Yes
Fingerprint scanner	✓	Yes	No	No	No
Waterproof	✗	No	Yes	No	No
Extra features	None	Stereo speakers	PlayStation certified	None	None
Geekbench 3.0 (single)	1816	Not tested	967	1487	Not tested
Geekbench 3.0 (multi)	4523	2769	2719	2703	Not tested
SunSpider	Not tested	1079ms	1099ms	400ms	1329ms
GFXBench: T-Rex	48fps	14fps	27fps	23fps	Not tested
GFXBench: Manhattan	Not tested	3fps	Not tested	Not tested	Not tested
Battery	7340mAh, non-removable	7900mAh, non-removable	6000mAh, non-removable	8600mAh, non-removable	9000mAh, non-removable
Dimensions	240x169.5x6.1mm	247x177x6.6mm	266x172x6.4mm	240x169x7.5mm	264x178x8.9mm
Weight	437g	465g	439g	469g	603g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/PLQXWSZ	TINYURL.COM/OESDFZQ	TINYURL.COM/M8BZZUN	TINYURL.COM/NVOOF6H	TINYURL.COM/PUAG9RN

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Best smartwatches	1 LG G Watch R	2 Huawei Watch	3 Motorola Moto 360	4 Sony Smartwatch 3	5 LG Watch Urbane
Price	£195 inc VAT	£289 inc VAT	£199 inc VAT	£189 inc VAT	£259 inc VAT
Website	Lg.com/uk	Consumer.huawei.com/en	Motorola.co.uk	Sony.co.uk	Lg.com/uk
Overall rating	★★★★½	★★★★☆	★★★★½	★★★½☆	★★★★☆
Operating system	Android Wear	Android Wear	Android Wear	Android Wear	Android Wear
Compatibility	Android	Android	Android	Android	Android
Display	1.3in 320x320 P-OLED	1.4in 400x400 AMOLED	1.56in 290x320 LCD	1.6in 320x320 LCD	1.3in 320x320 P-OLED
Processor	1.2GHz Snapdrgon 400	Snapdragon 400	TI OMAP 3	1.2GHz ARM V7	1.2GHz Snapdragon 400
RAM	512MB	512MB	512MB	512MB	512MB
Storage	4GB	4GB	4GB	4GB	4GB
Waterproof	Yes	Yes	Yes	Yes	Yes
Battery	410mAh	300mAh	320mAh	420mAh	410mAh
Dimensions	46.4x53.6x9.7mm	42x11.3mm	46x11.5mm	36x51x10mm	46x52x10.9mm
Weight	62g	40g	49g (leather band model)	45g	67g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/QATY8FT	TINYURL.COM/PXV9PVX	TINYURL.COM/O9C69K6	TINYURL.COM/OQVZ3PN	TINYURL.COM/Q3VK7ES

Best smartwatches	6 Asus ZenWatch	7 Apple Watch	8 Pebble Steel	9 LG G Watch	10 Sony Smartwatch 2
Price	£199 inc VAT	£299 inc VAT	£179 inc VAT	£159 inc VAT	£125 inc VAT
Website	Uk.asus.com	Apple.com/uk	Getpebble.com	Lg.com/uk	Sony.co.uk
Overall rating	★★★½☆	★★★☆☆	★★★★☆	★★★★☆	★★★★☆
Operating system	Android Wear	watchOS	Proprietary	Android Wear	Proprietary
Compatibility	Android	iOS	iOS, Android	Android	Android
Display	1.6in 320x320 AMOLED	1.32in 340x312 Ion-X Glass	1.26in 144x168 E-Paper	1.65in 280x280 IPS	1.6in 220x176 LCD
Processor	1.2GHz Snapdragon 400	Apple S1	Not specified	1.2GHz Snapdragon 400	Not specified
RAM	512MB	512MB	512MB	512MB	Not specified
Storage	4GB	8GB	Not specified	4GB	Not specified
Waterproof	Yes	Yes	Yes	Yes	Yes
Battery	1.4Wh	Not specified	130mAh	400mAh	Not specified
Dimensions	51x39.9x7.9-9.4mm	38.6x33.3x10.5mm	46x34x10.5mm	37.9x46.5x9.95mm	42x41x9mm
Weight	75g	72g	156g	63g	123g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/NN7GA7W	TINYURL.COM/OUTH9XK	TINYURL.COM/PPBXV7J	TINYURL.COM/Q84WL6L	TINYURL.COM/P4X7AZM

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PC ADVISOR TEST CENTRE

Best activity trackers	1 Fitbit Charge HR	2 Fitbit Surge	3 Fitbit One	4 Microsoft Band	5 Fitbit Charge
Price	£119 inc VAT	£199 inc VAT	£79 inc VAT	£169 inc VAT	£99 inc VAT
Website	Fitbit.com/uk	Fitbit.com/uk	Fitbit.com/uk	Microsoft.com/en-gb	Fitbit.com/uk
Overall rating	★★★★½	★★★★½	★★★★½	★★★½☆	★★★★☆
Compatibility	iOS, Android, Windows	iOS, Android, Windows	iOS, Android	iOS, Android, Windows	iOS, Android, Windows
Display	OLED	Touchscreen	OLED	TFT	OLED
Pedometer	Yes	Yes	Yes	Yes	Yes
Heart-rate monitor	Yes	Yes	No	Yes	No
Sleep tracking	Yes	Yes	Yes	Yes	Yes
Alarm	Yes	Yes	Yes	Yes	Yes
Third-party app synching	Yes	Yes	Yes	Yes	Yes
Call notifications	Yes	Yes	No	Yes	Yes
Waterproof	Yes	Yes	No	Yes	Yes
Battery life	5+ days	5 days	10-14 days	2 days	7-10 days
Dimensions, weight	21.1mm, 26g	34mm, 51g	35.5x28x9.65mm, 8g	11x33mm, 60g	21.1mm, 24g
FULL REVIEW	TINYURL.COM/PCKV4SU	TINYURL.COM/O83DR47	TINYURL.COM/PT2TC6F	TINYURL.COM/LHMQ2AC	TINYURL.COM/PFMQ9KH

Best activity trackers	6 Basis Peak	7 Xiaomi Mi Band	8 Jawbone Up 2	9 Jawbone Up Move	10 Jawbone Up24
Price	£169 inc VAT	£29 inc VAT	£89 inc VAT	£39 inc VAT	£99 inc VAT
Website	En-gb.mybasis.com	Mobilefun.co.uk	Jawbone.com	Jawbone.com	Jawbone.com
Overall rating	★★★½☆	★★★★½	★★★★☆	★★★★☆	★★★½☆
Compatibility	iOS, Android	iOS, Android	iOS, Android	iOS, Android	iOS, Android
Display	E-Ink	No	No	No	No
Pedometer	Yes	Yes	Yes	Yes	Yes
Heart-rate monitor	Yes	No	No	No	No
Sleep tracking	Yes	Yes	Yes	Yes	Yes
Alarm	No	Yes	Yes	No	Yes
Third-party app synching	No	No	Yes	Yes	Yes
Call notifications	Yes	Yes	No	No	No
Waterproof	Yes	Yes	Splashproof	Splashproof	Splashproof
Battery life	4 days	30 days	7 days	Six months, non-rechargable	7 days
Dimensions, weight	33x43x10mm, 51g	157-205mm, 13g	220x11.5x3-8.5mm, 25g	27.6x27.6x9.8mm, 6.8g	S: 19g, M: 22g, L: 23g
FULL REVIEW	TINYURL.COM/LHMQ2AC	TINYURL.COM/QZ3YVCR	TINYURL.COM/PHT98ZK	TINYURL.COM/PFXQFNE	TINYURL.COM/ND8YMB8

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Best budget printers

	1 HP OfficeJet 3830	2 Samsung Xpress M2022W	3 Brother HL-1110	4 Canon Pixma MX535	5 Canon i-Sensys LBP6230dw
Price	£60 inc VAT	£79 inc VAT	£59 inc VAT	£70 inc VAT	£91 inc VAT
Website	Hp.com/uk	Samsung.com/uk	Brother.co.uk	Canon.co.uk	Canon.co.uk
Overall rating	★★★★☆	★★★★✫	★★★★☆	★★★★☆	★★★★✫
Technology	Colour inkjet	Mono laser	Mono laser	Colour inkjet	Mono laser
Max print resolution	1200x1200dpi	1200x1200dpi	600x600dpi	4800x1200dpi	1200x1200dpi
Actual print speed	B=11ppm C=4ppm	B=20ppm	B=16.4ppm	B=9.7ppm C=3.8ppm	B=22.2ppm
Scan/fax facilities	None	1200x1200 scans	None	1200x2400 scans/fax	None
Supported interfaces	USB 2.0, 802.11b/g/n, AirPrint	USB 2.0, 802.11b/g/n	USB 2.0	USB 2.0, 802.11b/g/n, AirPrint	USB 2.0, 802.11b/g/n
Cost per page	B=6p C=7p	B=2p	B=2.7p	B=2.7p C=4.8p	B=2p
Media card/auto duplex	✗✓	✗✗	✗✗	✗✓	✗✓
Input capacity	60 sheets	150 sheets	150 sheets	100 sheets + 30-sheet ADF	250 sheets
Dimensions	222x454x362mm	332x215x178mm	340x238x189mm	458x385x200mm	379x293x243mm
Weight	5.8kg	4kg	4.5kg	8.5kg	7kg
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/PJ4K9D7	TINYURL.COM/PQ9JUDN	TINYURL.COM/OQE9LGJ	TINYURL.COM/N9LXVN7	TINYURL.COM/KZW8VU3

Best printers

	1 Canon Pixma MG7550	2 Samsung Xpress M2835DW	3 Canon i-Sensys MF6180dw	4 Epson WorkForce Pro	5 Brother HL-L9200CDWT
Price	£130 inc VAT	£143 inc VAT	£320 inc VAT	£200 inc VAT	£548 inc VAT
Website	Canon.co.uk	Samsung.com/uk	Canon.co.uk	Epson.co.uk	Brother.co.uk
Overall rating	★★★★✫	★★★★✫	★★★★✫	★★★★✫	★★★★✫
Technology	Colour inkjet	Mono laser	Mono laser	Colour inkjet	Colour laser
Max print resolution	9600x2400dpi	4800x600dpi	1200x600dpi	4800x1200dpi	2400x600dpi
Actual print speed	B=14.3ppm	B=22.7ppm	B=24ppm	B=18.9ppm	B=30ppm C=30ppm
Scan/fax facilities	2400x4800dpi scanner	None	600dpi scanner, 33.6Kb/s fax	None	None
Supported interfaces	USB 2.0, ethernet, 802.11b/g/n	USB 2.0, ethernet, 802.11b/g/n	USB 2.0, ethernet, 802.11b/g/n	USB 2.0, ethernet, 802.11b/g/n	USB 2.0, ethernet, 802.11b/g/n
Cost per page	B=2.4p C=8.1p	B=1.5p	B=1.5p	B=1.1p	B=1p C=5.9p
Media card/auto duplex	✗✓	✗✓	✗✓	✗✓	✗✓
Input capacity	125 sheets	250 sheets	250 + 50 sheet + 50 ADF	250 + 80 sheet	750 sheets + 50 sheet
Dimensions	435x370x148mm	368x335x202mm	390x473x431mm	3461x442x284mm	410x495x445mm
Weight	7.9kg	7.4kg	19.1kg	11.4kg	28.3kg
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/PZ3SVH7	TINYURL.COM/QECOF7V	TINYURL.COM/LE9WA5N	TINYURL.COM/OC7FUJ3	TINYURL.COM/PT52MH6
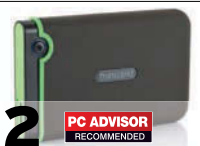
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PC ADVISOR TEST CENTRE

Best wireless routers	1 **Apple AirPort Extreme** PC ADVISOR BEST BUY	2 **Netgear Nighthawk R7000** PC ADVISOR RECOMMENDED	3 **AVM Fritz!Box 3490** PC ADVISOR RECOMMENDED	4 **TP-Link Archer VR900**	5 **Asus DSL-AC68U**
Price	£169 inc VAT	£150 inc VAT	£135 inc VAT	£139 inc VAT	£129 inc VAT
Website	Apple.com/uk	Netgear.co.uk	En.avm.de	Tp-link.com	UK.asus.com
Overall rating	★★★★☆	★★★★½	★★★★½	★★★★½	★★★★½
Standards supported	802.11a/b/g/n/ac	802.11a/b/g/n/ac	802.11a/b/g/n/ac	802.11a/b/g/n/ac	802.11a/b/g/n/ac
Frequency modes	2.4GHz/5GHz (concurrent)	2.4GHz/5GHz (concurrent)	2.4GHz/5GHz (concurrent)	2.4GHz/5GHz (concurrent)	2.4GHz/5GHz (concurrent)
Antennas	6x internal	3x external	Internal	3x external	3x external
Built-in modem	✗	✗	✗	✓	✓
Manufacturer's rating	1300/450Mb/s	1300/600Mb/s	1300/450Mb/s	1300/600Mb/s	1300/600Mb/s
WPS	✗	✓	✓	✓	✓
Ports	Gigabit WAN, 3x gigabit LAN, USB	Gigabit WAN, 1x USB 3.0, 1x USB 2.0	ADSL, 4x gigabit LAN, 2x USB 3.0	Gigabit WAN, 1x USB 3.0, 1x USB 2.0	1x USB 3.0, 4 x RJ45, 1x RJ11
Average power use	8W	9W	8W	N/S	N/S
Max speed (11n/11ac)	171/572Mb/s	171/592Mb/s	114/563Mb/s	146/622Mb/s	114/565.3Mb/s
Dimensions, weight	98x168x98mm, 945g	285x186x45mm, 750g	190x120x60mm/Not specified	245x181x90mm, 720g	220x160x83.3mm, 640g
Warranty	1 year	Not specified	Not specified	Not specified	Not specified
FULL REVIEW	TINYURL.COM/MFDLLSC	TINYURL.COM/Q2NRQ8Q	TINYURL.COM/PHQ34EG	TINYURL.COM/OF8KYPC	TINYURL.COM/PGHOUFQ

Best powerline adaptors	1 **Solwise SmartLink 1200AV2**	2 **TrendNet Powerline 500 AV2**	3 **TP-Link AV1200**	4 **Devolo dLan 1200+**	5 **Devolo dLAN 500AV**
Price	£43 inc VAT	£41 inc VAT	£88 inc VAT	£119 inc VAT	£129 inc VAT
Website	Solwise.com	Trendnet.com	Uk.tp-link.com	Devolo.com/uk	Devolo.com/uk
Overall rating	★★★★½	★★★★½	★★★★☆	★★★★½	★★★★☆
No of adaptors in kit	1 (2 required)	2	2	2	2
Max throughput	1200Mb/s	600Mb/s	1200Mb/s	1200Mb/s	500Mb/s
Near test result	410Mb/s	146Mb/s	500Mb/s	357Mb/s	96Mb/s
Far test result	107Mb/s	71Mb/s	200Mb/s	126Mb/s	47Mb/s
Ethernet ports	2x gigabit	1x gigabit	1x gigabit	1x gigabit	3x gigabit
Passthrough socket	Yes	No	Yes	Yes	Yes
Wireless hotspot	No	No	No	No	Yes
Encryption	128-bit	128-bit	128-bit	128-bit	128-bit
Dimensions	62x122x41mm	55x87x58mm	230x190x100mm	130x66x42mm	152x76x40mm
Weight	Not specified	90g	898g	Not specified	Not specified
Warranty	2 years	3 years	1 year	3 years	3 years
FULL REVIEW	TINYURL.COM/NZ4EJW8	TINYURL.COM/QYEPJQ7	TINYURL.COM/NVONCWT	TINYURL.COM/Q4EOO4M	TINYURL.COM/OVNPPQ7

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Best NAS drives	1 Qnap TS-421	2 Synology DS115j	3 Qnap HS-210	4 WD My Cloud EX2100	5 Synology DS414j
Price	£320 inc VAT (diskless)	£83 inc VAT (diskless)	£190 inc VAT (diskless)	£205 inc VAT (diskless)	£270 inc VAT (diskless)
Website	Qnap.com	Synology.com	Qnap.com	Wd.com	Synology.com
Overall rating	★★★★☆	★★★★☆	★★★★½	★★★★☆	★★★★☆
Drive bays	4	1	2	2	4
Processor	2GHz Marvell single-core	800MHz Marvell Armada 370	1.6GHz Marvell single-core	1.3 GHz Marvel Armada 385	1.2GHz Mindspeed Concerto
Memory	1GB DDR3	256MB DDR3	512MB DDR3	1GB DDR3	512MB DDR3
Remote access	✓	✓	✓	✓	✓
eSATA	2x	✗	✗	✗	1x
USB port	2x USB 3.0, 2x USB 2.0	2x USB 2.0	2x USB 3.0, 2x USB 2.0	2x USB 3.0	1x USB 3.0, 1x USB 2.0
Raid options	0/1/5/6/10/JBOD	None	0/1/JBOD	00/1/JBOD	0/1/5/6/10/JBOD
Software	Backup Station	DSM 5.1	HD Station	My Cloud	DSM 5.0
Dimensions	177x180x235mm	71x161x224mm	302x220x41mm	216x109x148mm	184x168x230mm
Weight	3kg	700g	1.5kg	3.5kg	2.2kg
Warranty	2 years	1 year	2 years	3 years	3 years
FULL REVIEW	TINYURL.COM/MCYWUB8	TINYURL.COM/MNEYVNK	TINYURL.COM/OEXRYNY	TINYURL.COM/M643BSG	TINYURL.COM/M643BSG

Best external hard drives	1 Seagate Backup Plus Slim	2 Transcend StoreJet 25M3	3 WD My Passport Ultra Metal	4 Toshiba Canvio Basics	5 Seagate Seven mm
Price	£74 inc VAT	£70 inc VAT	£90 inc VAT	£76 inc VAT	£99 inc VAT
Website	Seagate.com/gb/en	Uk.transcend-info.com	Wdc.com/en	Toshiba.co.uk	Seagate.com/gb/en
Overall rating	★★★★½	★★★★½	★★★★☆	★★★★☆	★★★★☆
Capacity tested	2TB	2TB	2TB	2TB	500GB
Capacity range	500GB, 1TB, 2TB	500GB, 1TB, 2TB	1TB, 2TB	500GB, 1TB, 2TB	500GB
Disk size	2.5in	2.5in	2.5in	2.5in	2.5in
Spin speed	N/A	5400rpm	N/A	5400rpm	5400rpm
Transfer speed	142MB/s	135MB/s	114MB/s	117MB/s	49MB/s
Encryption	N/A	256-bit AES	256-bit AES	256-bit AES	N/A
Other interfaces	USB 3.0	USB 3.0	USB 3.0	USB 3.0	USB 3.0
Software	Seagate Dashboard	Transcend Elite	WD Drive Utilities	None	Seagate Dashboard
Dimensions	113.5x76x12.1mm	130x82x19mm	110x80x19mm	111x79x21mm	123x82x7mm
Weight	159g	234g	241g	207g	178g
Warranty	2 years	3 years	3 years	2 years	2 years
FULL REVIEW	TINYURL.COM/OABWL4B	TINYURL.COM/M72D3EP	TINYURL.COM/L2B7V3B	TINYURL.COM/JWHHACB	TINYURL.COM/O6KZFDM

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PC ADVISOR TEST CENTRE

Best SSDs	1 OCZ Arc 100	2 Samsung 850 Pro	3 SanDisk Extreme Pro	4 Crucial MX200	5 Kingston HyperX Savage
Price	£69 inc VAT	£365 inc VAT	£172 inc VAT	£301 inc VAT	£185 inc VAT
Website	Ocz.com	Samsung.com/uk	Sandisk.co.uk	Uk.crucial.com	Kingston.com/en
Overall rating	★★★★½	★★★★½	★★★★½	★★★½	★★★½
Capacity tested	240GB	1TB	480GB	1TB	480GB
Price per GB	28.8p	36.5p	35.8p	30.1p	38.5p
Memory cache	512MB DDR3	1GB LPDDR2	1GB	1GB DDR3	256MB
Controller	Indilinx Barefoot 3 M10	Samsung MCX	Marvell 88SS9187	Marvell 88SS9189	Phison PS3110 S10
Encryption	AES 256-bit	AES 256-bit	AES 256-bit	AES 256-bit	Unknown
Flash	Toshiba 19nm MLC	Samsung 40nm V-AND MLC	SanDisk 19nm MLC	Micron 16nm MLC	Toshiba 19nm A19 MLC
Firmware updated via	OCZ SSD Guru	Samsung SSD Magician	SandDisk SSD Dashboard	Crucial Storage Executive	None
ATTO peak sequential	489-/447MB/s	564-/534MB/s	556-/525MB/s	533-/514MB/s	564-/543MB/s
CDM peak IOPS	79.2-/90.3MB/s	103.2-/93.7MB/s	102.7/91.4MB/s	26.1/90.1MB/s	91.6-/94.8MB/s
CDM 4kB rnd	27-/127MB/s	36-/89MB/s	32-/88MB/s	29-/131MB/s	26-59MB/s
Warranty	3 years	10 years	10 years	3 years	3 years
FULL REVIEW	TINYURL.COM/QZQLYY4	TINYURL.COM/OVHDALD	TINYURL.COM/NMSJU25	TINYURL.COM/P3YX2KE	TINYURL.COM/ON54VUC

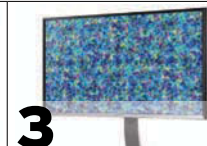| Smart thermostats	1 Honeywell EvoHome	2 Heat Genius	3 Nest Learning Thermostat	4 Hive Active Heating	5 Tado
Price (from)	£249 inc VAT	£249 inc VAT	£179 inc VAT	£179 inc VAT	£199 inc VAT
Website	Honeywelluk.com	Heatgenius.co.uk	Nest.com	Hivehome.com	Tado.com/gb
Overall rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Zones controlled	12	6	1	1	1
Hot water control	✓	✓	✗	✓	✓
Underfloor heating	✓	✗	✗	✗	✗
Warranty	18 months	2 years	2 years	1 year	1 year
Verdict	EvoHome is the best smart heating system we've tested. It isn't perfect though, and it's also very expensive, or can be. But if you value convenience and comfort above saving money, it's the one to buy.	Heat Genius is very good at a very useful thing. It is easy to use and efficient. How long it takes to pay for itself will depend on your circumstances, and it may be that a full system is too much of a long-term investment for you. If you are looking to install in your a zoned smart heating system, we are happy to recommend Heat Genius.	If you need only a single thermostat and don't need control over hot water, the Nest is a good choice. The Nest Protect smoke and carbon monoxide alarm also works with the thermostat, but it's not cheap. There's also the Nest Cam, but the tie-in with the thermostat is minimal.	The Hive Active Heating system is a great upgrade for anyone that wants or needs the ability to be able to control their heating remotely. It's by no means the most advanced smart thermostat, but it will do the job at a good price for a lot of people.	Tado is the best smart thermostat if you like the idea of presence detection as it simply follows you and your smartphone via GPS, and turns the heating up or down as you get further away or nearer home. There's also hot water control, but the thermostat itself isn't the best looking.
FULL REVIEW	TINYURL.COM/Q3CXA4Z	TINYURL.COM/Q2TUKL9	TINYURL.COM/N9MWV4G	TINYURL.COM/PDLCSAS	TINYURL.COM/O4K3A2A

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Best budget graphics cards

	1 Sapphire Radeon R7 250X	2 MSI R7 260X OC	3 EVGA GeForce GTX 750	4 Asus GeForce GT 740 OC	5 MSI GeForce GT 730
Price	£65 inc VAT	£91 inc VAT	£90 inc VAT	£65 inc VAT	£48 inc VAT
Website	Sapphiretech.com	Uk.msi.com	Eu.evga.com	Asus.com/uk	Uk.msi.com
Overall rating	★★★★½	★★★½☆	★★★½☆	★★★½☆	★★★½☆
Graphics processor	AMD Radeon R7 250X	AMD Radeon R7 260X	nVidia GeForce GTX 750	nVidia GeForce GT 740	nVidia GeForce GT730
Installed RAM	1GB GDDR5	2GB GDDR5	1GB GDDR5	1GB GDDR5	2GB GDDR3
Memory interface	128-bit	128-bit	128-bit	128-bit	128-bit
Core clock	950MHz	1175MHz	1294MHz	1033MHz	780MHz
Memory clock/Effective	1125/4500MHz	1625MHz/6.5GHz	1253/5012MHz	1.25/5GHz	900/1800MHzHz
Stream processors	640	896	512	384	320
Texture units	40	56	32	32	20
Power connectors	1x 6-pin	1x 6-pin	None	1x 6-pin	1x 6-pin
DirectX	12	11.1	Unknown	Unknown	Unknown
Digital interface	1x DVI, HDMI, DisplayPort	2x DVI, HDMI, Mini-DP	1x DVI, HDMI, DisplayPort	1x DVI, HDMI, VGA	1x DVI, HDMI, VGA
Warranty	2 years	3 years	3 years	3 years	2 years
FULL REVIEW	TINYURL.COM/OLJ83SQ	TINYURL.COM/OZ6WUYT	TINYURL.COM/PB3F6EN	TINYURL.COM/PAH5VMJ	TINYURL.COM/P8J4C2R

Best graphics cards

	1 Asus GeForce GTX 980 Ti	2 Zotac GeForce GTX 980 Ti	3 MSI GTX 980 Gaming 4G	4 Club3D Radeon R9 390	5 XFX Radeon R9 390X
Price	£639 inc VAT	£532 inc VAT	£404 inc VAT	£288 inc VAT	£309 inc VAT
Website	Asus.com/uk	Zotac.com	Uk.msi.com	Club-3d.com	Xfxfore.com/en-gb
Overall rating	★★★★★	★★★★½	★★★★½	★★★★½	★★★★☆
Graphics processor	nVidia GeForce GTX 980 Ti	nVidia GeForce GTX 980 Ti	nVidia GeForce GTX 980	AMD Radeon R9 390	AMD Radeon R9 390X
Installed RAM	12GB	12GB	4GB	8GB	8GB
Memory interface	384-bit	512-bit	256-bit	512-bit	512-bit
Core clock/boost	1216/1317MHz	1105/1140MHz	1216/1317MHz	1010MHz	1050MHz
Memory clock	7200MHz	7010MHz	7010MHz	6000MHz	6000MHz
Stream processors	2816	2816	2048	2560	2816
Texture units	172	172	128	160	176
Power connectors	2x 8-pin	1x 8-pin, 1x 6-pin	2x 8-pin	1x 8-pin, 1x 6-pin	1x 8-pin, x 6-pin
DirectX	12	12	12	12	12
Digital interface	DVI, HDMI 2.0, 3x DisplayPort 1.2	DVI, HDMI, 3x Mini-DisplayPort	DVI, HDMI, 3x DisplayPort	2x DVI, HDMI, DisplayPort 1.2	2x DVI, HDMI, DisplayPort 1.2
Warranty	3 years	5 years	3 years	2 years	3 years
FULL REVIEW	TINYURL.COM/NDZZQKJ	TINYURL.COM/POYHNUH	TINYURL.COM/Q5OPK9S	TINYURL.COM/PC5PGWM	TINYURL.COM/Q8Q2GVS

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Best budget flat-panel displays

	AOC i2369Vm	Philips 234E5QHAW	NEC MultiSync E243WMi	BenQ EW2740L	BenQ GL2450
Price	£130 inc VAT	£130 inc VAT	£194 inc VAT	£175 inc VAT	£108 inc VAT
Website	Aoc-europe.com/en	Philips.co.uk	Nec-display-solutions.com	Benq.co.uk	Benq.co.uk
Overall rating	★★★★⯪	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Screen size	23in	23in	23.8in	27in	24in
Panel type	IPS matt	IPS matt	IPS matt	VA semi-matt	TN matt
Native resolution	1920x1080	1920x1080	1920x1080	1920x1080	1920x1080
Pixel density	96ppi	96ppi	93ppi	82ppi	92ppi
Brightness	220cd/m²	187cd/m²	250cd/m²	300cd/m²	261cd/m²
Static contrast ratio	630:1	210:1	650:1	280:1	610:1
Response time	6ms	5ms	6ms	4ms	5ms
Ports	HDMI, HDMI/MHL, DP, VGA	2x HDMI (QHAB) or 1x HDMI (QDAB), VGA	DP, DVI-D, VGA	2x HDMI, VGA	DVI-D, VGA
Dimensions	531x204x398mm	532x213x414mm	558x214x380-490mm	623x191x451mm	579x179x436mm
Weight	3.75kg	3.5kg	6.3kg	4.2kg	4.1kg
Warranty	3 years	2 years	3 years	2 years	2 years
FULL REVIEW	TINYURL.COM/OOEFYPR	TINYURL.COM/KLYLW4V	TINYURL.COM/KNCGVOU	TINYURL.COM/OO6EC5L	TINYURL.COM/OOUPFUE

Best 4K flat-panel displays

	BenQ BL3201PT	Philips BDM4065UC	Samsung UD970	Acer S277HK	ViewSonic VP2780-4K
Price	£699 inc VAT	£600 inc VAT	£1,400 inc VAT	£499 inc VAT	£699 inc VAT
Website	Benq.co.uk	Philips.co.uk	Samsung.com/uk	Acer.co.uk	Viewsoniceurope.com/uk
Overall rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Screen size	32in	40in	31.5in	27in	27in
Panel type	IPS	VA	PLS	IPS	IPS
Native resolution	3840x2160	3840x2160	3840x2160	3840x2160	3840x2160
Pixel density	157ppi	110ppi	140ppi	163ppi	163ppi
Brightness	350cd/m²	120cd/m²	350cd/m²	300cd/m²	350cd/m²
Static contrast ratio	1000:1	5000:1	1000:1	530:1	1000:1
Response time	4ms	8.5ms	8ms	4ms	5ms
Ports	DVI-DL, HDMI, DP, mDP	HDMI, DP, mDP, VGA	HDMI, DVI, 4x USB 3.0	DVI, HDMI, DP, mDP, 4x USB 3.0	HDMI, DP, 4x USB 3.0
Dimensions	490.2x740.3x213.4mm	904x512x88mm	728x427x62mm	614x406x113mm	642.7x469.7x347.8mm
Weight	12.5kg	8.5kg	10.3kg	4.9kg	11.7kg
Warranty	3 years	2 years	Not specified	Not specified	3 years
FULL REVIEW	TINYURL.COM/NPA62QL	TINYURL.COM/Q2W3VZY	TINYURL.COM/OBWBBYN	TINYURL.COM/NTV4EVD	TINYURL.COM/O69CMTB

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Best e-book readers	1 Amazon Kindle Voyage	2 Amazon Kindle (7th gen)	3 Amazon Kindle Paperwhite	4 Nook GlowLight	5 Kobo Aura H20
Price	£169 inc VAT	£59 inc VAT	£109 inc VAT	£89 inc VAT	£139 inc VAT
Website	Amazon.co.uk	Amazon.co.uk	Amazon.co.uk	Nook.com/gb	Kobo.com
Overall rating	★★★★☆	★★★⯪☆	★★★★☆	★★★★☆	★★★☆☆
Screen size	6in touchscreen	6in touchscreen	6in touchscreen	6in touchscreen	6.8in touchscreen
Screen technology	E Ink	E Ink	E Ink	E Ink	E Ink
Screen resolution	1440x1080	600x800	768x1024	758x1024	1430x1080
Built-in light	Yes	No	Yes	Yes	Yes
Storage	4GB	4GB	2GB	4GB	4GB, microSD up to 32GB
Book store	Amazon Kindle	Amazon Kindle	Amazon Kindle	Nook	Kobo
Cellular connectivity	Optional extra	No	Optional extra	No	No
Battery life	Six weeks	Four weeks	Eight weeks	Eight weeks	Two months
Dimensions	162x115x7.6mm	169x119x10.2mm	117x169x9.1mm	127x166x10.7mm	179x129x9.7mm
Weight	180g	191g	206g	175g	233g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/NXAAU3Q	TINYURL.COM/NSFORJE	TINYURL.COM/PREZPRK	TINYURL.COM/OZ5WMPO	TINYURL.COM/MJVR4M9

Best media streamers	1 Roku Streaming Stick	2 Roku 3	3 Google Chromecast	4 Amazon Fire TV Stick	5 Apple TV
Price	£49 inc VAT	£99 inc VAT	£30 inc VAT	£35 inc VAT	£59 inc VAT
Website	Roku.com	Roku.com	Play.google.com	Apple.com/uk	Apple.com/uk
Overall rating	★★★★⯪	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Type	Dongle	Set-top box	Dongle	Dongle	Set-top box
Ports	HDMI, Micro-USB	HDMI, USB, ethernet	HDMI, Micro-USB	HDMI, Micro-USB	HDMI, ethernet, Micro-USB
Processor	600MHz single-core	900MHz single-core	Single-core	Dual-core	Apple A5 single-core
RAM	512MB	512MB	512MB	1GB	512MB
Graphics	Not specified	Not specified	Not specified	Not specified	Not specified
Storage	None	512MB plus microSD slot	None	8GB (not user-accessible)	8GB (not user-accessible)
Voice search	No	Yes	No	No	No
Remote control	Yes	Yes	No	Yes	Yes
Dimensions	78.7x27.9x12.7mm	89x89x25mm	72x35x12mm	84.9x25x11.5mm	98x98x23mm
Weight	18g	170g	34g	25g	270g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/OAP9QF9	TINYURL.COM/PT7MGUL	TINYURL.COM/QBGTCS2	TINYURL.COM/NAQRNOC	TINYURL.COM/OLCJRC3

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PC ADVISOR TEST CENTRE

Best games consoles

	1 Sony PlayStation 4	2 Microsoft Xbox One	3 Nintendo Wii U Premium	4 Sony PlayStation 3 Super Slim	5 Microsoft Xbox 360
Price	£349 inc VAT	£349 inc VAT	£249 inc VAT	£249 inc VAT	£199 inc VAT
Website	Playstation.com	Xbox.com	Nintendo.co.uk	Playstation .com	Xbox.com
Overall rating	★★★★☆	★★★★☆	★★★★☆	★★★★½	★★★★★
Processor	Octa-core AMD x86	1.75GHz octa-core AMD x86	IBM Power multicore CPU	IBM CPU	IBM Xenon CPU
Graphics	1.84TFlops AMD Radeon GPU	1.31TFlops AMD Radeon GPU	AMD Radeon GPU	256MB nVidia RSX	512MB ATI Xenos
RAM	8GB GDDR5	8GB DDR3	Not specified	Not specified	512MB GDDR3
Storage	500GB	500GB	32GB, plus SD card support	500GB	500GB
Optical drive	Blu-ray, DVD, game discs	Blu-ray, DVD, game discs	Wii U, Wii discs only	Blu-ray, DVD, game discs	DVD, game discs
Ports	2x USB 3.0, AUX, HDMI	USB 3.0, HDMI	4x USB 2.0, HDMI	2x USB 2.0, HDMI	5x USB, HDMI
Connectivity	Ethernet, 802.11b/g/n, Bluetooth	Ethernet, 802.11b/g/n	802.11b/g/n	Ethernet, 802.11b/g/n, Bluetooth	Ethernet, 802.11b/g/n
Other	1 controller	1 controller, 4K, Kinect option	1 controller	1 controller	1 controller
Dimensions	275x53x305mm	333x274x79mm	46x269x171mm	290x230x60mm	269x75x264mm
Weight	2.8kg	3.2kg	1.6kg	2.1kg	2.9kg
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/NBFLQK2	TINYURL.COM/M6J4KHS	TINYURL.COM/6J49LHL	TINYURL.COM/QDJP56O	TINYURL.COM/PFP9CCK

Best budget portable speakers

	1 Denon Envaya Mini	2 UE Roll	3 Lumsing B9	4 i-box Twist	5 Inateck MarsBox BP2002
Price	£99 inc VAT	£99 inc VAT	£23 inc VAT	£41 inc VAT	£46 inc VAT
Website	Denon.com	Ultimateears.com	Lumsing.com	Iboxstyle.com	Inateck.com
Overall rating	★★★★½	★★★★½	★★★★½	★★★★½	★★★★☆
Speaker(s)	Not specified	Not specified	Not specified	2x 3W	2x 5W
Bluetooth	Bluetooth 4.0	Bluetooth	Bluetooth 3.0 + EDR	Bluetooth 2.1	Bluetooth 4.0
Handsfree calls	Yes	No	Yes	Yes	Yes
NFC	Yes	Yes	Yes	No	No
Frequency response	Not specified	108Hz to 20kHz	20Hz to 20kHz	Not specified	76Hz to 108MHz
Impedence	Not specified	Not specified	4 ohms	Not specified	Not specified
Extra features	IPX4 splashproof	IPX7 splashproof	MicroSD slot, lanyard	None	None
Claimed battery life	10 hours	9 hours	25 hours	5 hours	10 to 15 hours
Dimensions	209x54x51mmmm	134x39x40mm	177x50x70mm	246x59x56mm	185.4x61.5x61.5mm
Weight	558g	330g	300g	380g	710g
Warranty	1 year	2 years	1 year	5 years	1 year
FULL REVIEW	TINYURL.COM/QDRNP3P	TINYURL.COM/O7T7ZUU	TINYURL.COM/P623MK8	TINYURL.COM/LET9RDF	TINYURL.COM/QBCJJG2

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Best budget headphones

	1 **Rock Jaw Alpha Genus**	2 **RHA MA450i**	3 **Sennheiser HD 429**	4 **AKG K77**	5 **SoundPeats A1**
Price	£41 inc VAT	£39 inc VAT	£45 inc VAT	£25 inc VAT	£25 inc VAT
Website	Rockjawaudio.com	Rha-audio.com/uk	En-uk.sennheiser.com	Uk.akg.com	Amazon.co.uk
Overall rating	★★★★½	★★★★½	★★★★½	★★★★☆	★★★★☆
Type	In-ear	In-ear	Circumaural over-ear	Circumaural over-ear	Circumaural over-ear
Frequency response	20Hz to 20kHz	16Hz to 22kHz	18Hz to 22kHz	18Hz to 20.5kHz	20Hz to 20kHz
Nominal impedence	16 ohms	16 ohms	32 ohms	32 ohms	Not specified
Sensitivity	108dB	103dB	110dB	112dB	Not specified
In-line remote	No	Yes (3 button)	No	No	No
Mic	No	Yes	No	No	Yes
Extra grommets	Yes, and filters	Yes	N/A	N/A	N/A
Carry case	Yes	Yes	No	No	No
Cable length	1.2m	1.5m (braided)	3m	2.5m	Not specified
Weight	11g	14g	218g	190g	210g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/NNYUFBF	TINYURL.COM/P7W7RVL	TINYURL.COM/ND8TD8O	TINYURL.COM/PA8FOX4	TINYURL.COM/NKFLHKL

Best headphones

|	1 **Denon AH-D600**	2 **Audio-Technica ATH-WS99**	3 **Bose QuietComfort 20**	4 **Denon AH-W150**	5 **Bowers & Wilkins P5**
Price	£229 inc VAT	£79 inc VAT	£259 inc VAT	£59 inc VAT	£249 inc VAT
Website	Denon.co.uk	Eu.audio-technica.com/en	Bose.co.uk	Denon.co.uk	Bowers-wilkins.co.uk
Overall rating	★★★★½	★★★★☆	★★★★½	★★★★½	★★★★½
Type	Circumaural over-ear	Over-ear	In-ear	Over-ear wireless buds	On-ear, foldable
Frequency response	8Hz to 25kHz	8Hz to 25kHz	20-21kHz	5Hz to 25kHz	10Hz to 20kHz
Nominal impedence	37 ohms	37 ohms	32 ohms	16 ohms	22 ohms
Sensitivity	120dB	120dB	105dB	102dB	108dB
In-line remote	Yes	Yes	Yes	Yes	No
Mic	No	Yes	Yes	Yes	Yes
Extra grommets	N/A	N/A	Yes	Yes	N/A
Carry case	Yes	No	Yes	Yes	No
Cable length	3m	0.8m	1.3m	N/A	1.2m
Weight	250g	250g	44g	23g	195g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/NBCFJW6	TINYURL.COM/QDRCCAT	TINYURL.COM/OEAGFOF	TINYURL.COM/O2CJV3R	TINYURL.COM/NNRV6UT

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PC ADVISOR TEST CENTRE

Best power banks

	1 Zendure A2 (2nd gen)	2 Xiaomi 10,000mAh	3 Maximas XTRON USB-C	4 iHarbot Power Bank MS024	5 Anker Astro Mini
Price	£25 inc VAT	£11 inc VAT	$69 (£45)	£7.50 inc VAT	£13 inc VAT
Website	Zendure.com	Mi.com/en	Indiegogo.com	Amazon.co.uk	Ianker.com
Overall rating	★★★★½	★★★★½	★★★★½	★★★★½	★★★★½
Capacity	6700mAh	10,000mAh	13,400mAh	5000mAh	3200mAh
Input	1x 7.5W Micro-USB	1x 10W Micro-USB	1x 10W Micro-USB	1x 10.5W Micro-USB	1x 4W Micro-USB
Outputs	1x 10.5W USB	1x 10.5W USB	1x 21W USB	1x 10W USB	1x 5W USB
Auto-on/-off	Yes	Yes	No	Auto-on	No
Passthrough charging	Yes	Yes	No	Yes	No
Status indicator	4 LEDs	4 LEDs	4 LEDs	4 LEDs	No
LED flashlight	No	No	No	No	No
Carry case	Yes	No	No	No	Yes
Dimensions	93x48x23mm	91x60.4x22mm	77x21x93mm	118x11.6x63mm	92x23x23mm
Weight	137g	207g	247g	150g	80g
Warranty	1 year	1 year	Not specified	18 months	18 months
FULL REVIEW	TINYURL.COM/NGCNO5F	TINYURL.COM/NFQZOCB	TINYURL.COM/PVO2LEC	TINYURL.COM/PVO2LEC	TINYURL.COM/PZHUHJO

Best desktop chargers

		1 CHOEtech 6-port Charger	2 Aukey USB Charging Station	3 iClever USB Travel Charger	4 Zendure Turbo Charger	5 Olixar Smart IC Charger
Price		£25 inc VAT	£17 inc VAT	£20 inc VAT	£25 inc VAT	£34 inc VAT
Website		Choetech.com	Hisgadget.com	Hisgadget.com	Zendure.com	Mobilefun.co.uk
Overall rating		★★★★½	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Max output		60W	54W	50W	40W	50W
Outputs:	USB 1	15W USB	9W USB	12W USB	12W USB	12.5W USB
	USB 2	15W USB	9W USB	12W USB	12W USB	12.5W USB
	USB 3	15W USB	9W USB	12W USB	12W USB	12.5W USB
	USB 4	15W USB	9W USB	12W USB	12W USB	12.5W USB
	USB 5	12W USB	18W USB	12W USB	12W USB	12.5W USB
	USB 6	15W USB	N/A	12W USB	N/A	12.5W USB
Colours available		Black	Black	Black	Black, white	White
Dimensions		71.5x29x88.4mm	94x60x25mm	100x69x27mm	97x60x27mm	100x69x26mm
Weight		158g	149g	180g	166g	189g
Warranty		1 year	1 year	1 year	1 year	2 years
FULL REVIEW		TINYURL.COM/QG4X5D9	TINYURL.COM/P2CZMCU	TINYURL.COM/MPA4DWC	TINYURL.COM/NKYNJ7P	TINYURL.COM/OCZXK93

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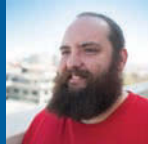
Windows under threat

Windows is under assault like it has never been before, and Microsoft could have used its sweeping Windows 10-powered New Xbox One Experience update to cut a powerful new competitor off at the knees. But it didn't.

From the rise of mobile technology to the tremendous slowing of PC performance increases to Apple's Mac surge, Windows has been looking wobbly for five years or more. What's worse (for Microsoft), the titanic mistake dubbed Windows 8 sparked a mutiny of sorts inside the PC industry itself, inspiring Valve – the company behind Steam – and over a dozen PC makers to gamble on Steam Machines: radically small PCs, powered by the Linux-based SteamOS, designed both to usurp Windows' iron-fisted control over PC gaming and to drag PC gaming into the living room.

After a long delay, the first wave of Steam Machines launched in November, alongside Valve's Steam Controller and Steam Link. Make no mistake about it: the appearance of a gaming-focused, Linux-based threat to Windows, backed by the largest and most beloved company in PC gaming, is nothing short of a major threat for Windows. We found our initial week in a Steam-powered living room nothing short of intoxicating.

But Steam Machines are far from perfect. In a nutshell, because they're full-blown gaming PCs in their own right, Steam Machines cost as much as or more than an Xbox One, but they're still stuck running Steam for Linux's limited game library. In order to play your full catalogue of Windows-centric Steam games, you have to stream those games from your Windows gaming PC to your Steam Machine using Valve's slick Steam in-home streaming feature.

It's a glaring potential pain point. This is where Microsoft could have struck with its New Xbox One Experience, but it failed to do so.

Leaning on its shared Windows 10 core, the Xbox One's NXOE lets you stream your Xbox games to any Windows 10 device in your house. Critically, however, it fails to do the reverse. You can't stream PC games from your Windows 10 system to your TV via the Xbox One, despite the fact that Steam in-home streaming and nVidia's GameStream technology already offer that very feature.

If Microsoft had enabled PC-to-Xbox One streaming in the New Xbox One Experience – which was pushed out a mere two days after the Steam Machine launch – it could have leveraged its console to hit a major competitor where it hurts, while that competitor's still in its infancy.

Ignoring the bare-bones Link, the cheapest Steam Machine available today costs around £450. The Xbox One sells for less than £300. If PC-to-Xbox streaming were enabled, that £299 would grant you access to not only the full Xbox One game library, but your full PC gaming library as well. Note that I didn't say your Steam library: while Steam Machines lock you into Valve's ecosystem, Microsoft could theoretically open the doors to your Origin, uPlay, and locally installed games, as well.

But it didn't. The NXOE's game-streaming is a one-way street, and it's pointing in a direction that does no good for PC gamers.

Maybe the Xbox One's weak AMD Jaguar CPU cores have issues decoding streams sent from PCs. Maybe Microsoft has focused on maximising the Xbox One's utility, or perhaps it's worried that allowing streaming from PCs could cannibalise Xbox game revenue. Arguably, that loss could be worthwhile if it staved off a threat toward Windows itself. Who knows?

For what it's worth, Microsoft says it's working to allow Windows 10 users to stream games to the Xbox One. Not having it ready in time to roll with the New Xbox One Experience – to shatter the Steam Machines before they get off the ground – feels like a significant miss, though. If Steam Machines rise in popularity during the upcoming holiday season, and enjoy even mild momentum in the years to come, this tardy Xbox One feature could wind up proving costly indeed. ⊠

> **If Microsoft had enabled PC-to-Xbox One streaming in the New Xbox One Experience, it could have leveraged its console to hit a major competitor where it hurts**

Zotac's tiny Steam Machine, next to Valve's Steam Controller

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